

DESCRIPTION

AMM  
4/20/00  
This Application is a <sup>NEW COMPOUND</sup> divisional application of Serial Number 08/809,723  
filed May 21, 1997  
5 CL TECHNICAL FIELD

The present invention relates to new polypeptide compound and a pharmaceutically acceptable salt thereof which are useful as a medicament.

10 CL BACKGROUND ART

In U.S. Pat. No. 5,376,634, there are disclosed the polypeptide compound and a pharmaceutically acceptable salt thereof, which have antimicrobial activities (especially antifungal activity).

15 CL DISCLOSURE OF INVENTION

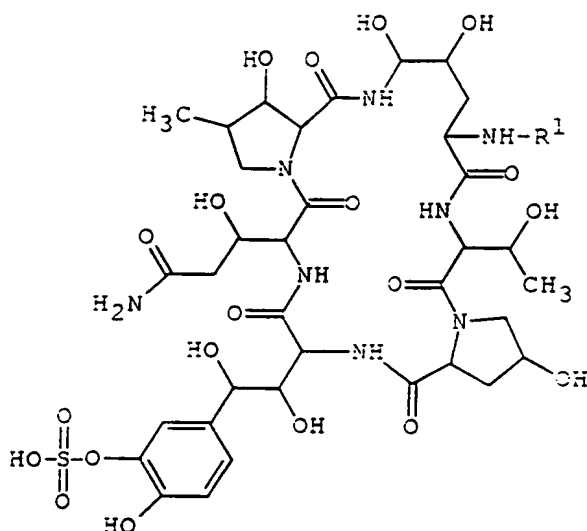
The present invention relates to new polypeptide compound and a pharmaceutically acceptable salt thereof.

More particularly, it relates to new polypeptide  
20 compound and a pharmaceutically acceptable salt thereof, which have antimicrobial activities (especially, antifungal activities, in which the fungi may include Aspergillus, Cryptococcus, Candida, Mucor, Actinomyces, Histoplasma, Dermatophyte, Malassezia, Fusarium and the like.), inhibitory activity on  $\beta$ -1,3-glucan synthase, and further which are expected to be useful for the prophylactic and/or therapeutic treatment of Pneumocystis carinii infection (e.g. Pneumocystis carinii pneumonia) in a human being or an animal, to a process for preparation thereof, to a pharmaceutical composition comprising the  
30 same, and to a method for the prophylactic and/or therapeutic treatment of infectious diseases including Pneumocystis carinii infection (e.g. Pneumocystis carinii pneumonia) in a human being or an animal.

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The object polypeptide compound used in the present invention are new and can be represented by the following general formula [I] :



P<sup>1</sup> wherein R<sup>1</sup> is lower alkanoyl substituted with unsaturated  
6-membered heteromonocyclic group containing  
at least one nitrogen atom which may have  
one or more suitable substituent(s);  
P<sup>1</sup> lower alkanoyl substituted with 1,2,3,4-  
tetrahydroisoquinoline which may have one or  
more suitable substituent(s);  
P<sup>1</sup> lower alkanoyl substituted with  
unsaturated condensed heterocyclic group  
containing at least one oxygen atom which  
may have one or more suitable  
substituent(s);  
P<sup>1</sup> lower alkanoyl substituted with  
unsaturated condensed heterocyclic group  
containing 1 to 3 sulfur atom(s) which may  
have one or more suitable substituent(s);  
P<sup>1</sup> lower alkanoyl substituted with

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PI

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P1

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aroyl substituted with 2 lower alkoxy;

PI aroyl substituted with aryl having lower alkyl;

PI aroyl substituted with aryl having higher alkyl;

5 PI aryloxy(lower)alkanoyl which may have one or more suitable substituent(s);

PI ar(lower)alkoxy(lower)alkanoyl which may have one or more suitable substituent(s);

10 PI arylamino(lower)alkanoyl which may have one or more suitable substituent(s);

PI lower alkanoyl substituted with pyrazolyl which has lower alkyl and aryl having higher alkoxy;

15 PI lower alkoxy(higher)alkanoyl, in which higher alkanoyl may have one or more suitable substituent(s);

20 PI aroyl substituted with aryl having heterocyclicoxy, in which heterocyclicoxy may have one or more suitable substituent(s);

PI aroyl substituted with cyclo(lower)alkyl having lower alkyl;

25 PI [ indolylcarbonyl having higher alkyl;  
naphthoyl having lower alkyl;  
naphthoyl having higher alkyl;  
naphthoyl having lower alkoxy(higher)alkoxy;

PI aroyl substituted with aryl having lower alkoxy(lower)alkoxy(higher)alkoxy;

30 PI aroyl substituted with aryl having lower alkoxy(lower)alkoxy;

PI aroyl substituted with aryl which has aryl having lower alkoxy;

35 PI aroyl substituted with aryl which has aryl having lower alkoxy(lower)alkoxy;



- PI aroyl substituted with aryl having  
heterocyclicoxy(higher)alkoxy;
- PI aroyl substituted with aryl having  
aryloxy(lower)alkoxy;
- 5 PI aroyl substituted with aryl having  
heterocycliccarbonyl(higher)alkoxy;
- PI lower alkanoyl substituted with oxazolyl  
which has aryl having higher alkoxy;
- 10 PI lower alkanoyl substituted with furyl  
which has aryl substituted with aryl having  
lower alkoxy;
- PI lower alkanoyl substituted with triazolyl  
which has oxo and aryl having higher alkyl;
- 15 PI higher alkanoyl having hydroxy;
- PI higher alkanoyl having ar(lower)alkyl and  
hydroxy;
- PI 3-methyl-tridecenoyl; or
- 20 PI (C<sub>2</sub>-C<sub>6</sub>)alkanoyl substituted with aryl  
having higher alkoxy, in which (C<sub>2</sub>-  
C<sub>6</sub>)alkanoyl may have amino or protected  
amino.

25 The new polypeptide compound [I] and a  
pharmaceutically acceptable salt thereof can be prepared  
by the process as illustrated in the following reaction  
scheme or can be prepared by elimination reaction of amino  
protective group in R<sup>1</sup>.

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Process 1

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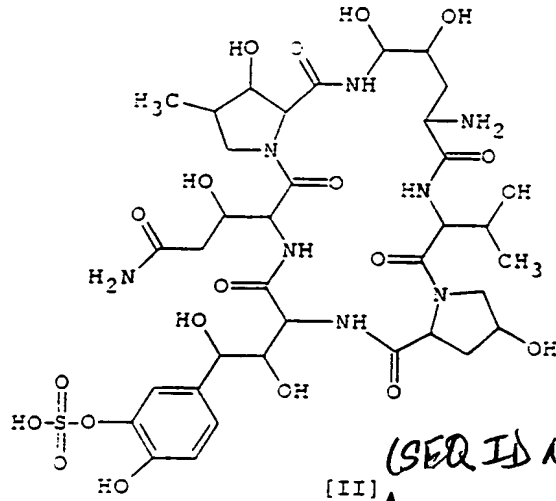
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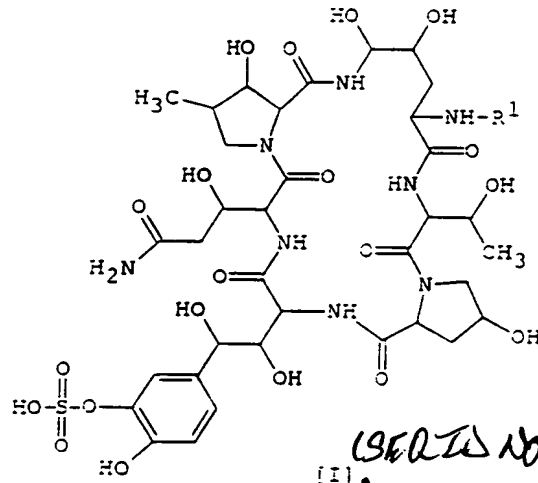
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or its reactive derivative  
at the amino group  
or a salt thereof

R<sup>1</sup>-OH [III]

or its reactive derivative  
at the carboxy group  
or a salt thereof



or a salt thereof

PS wherein R<sup>1</sup> is as defined above.

Suitable pharmaceutically acceptable salts of the object polypeptide compound [I] are conventional non-toxic salts and may include a salt with a base or an acid addition salt such as a salt with an inorganic base, for example, an alkali metal salt (e.g., sodium salt, potassium salt, etc.), an alkaline earth metal salt (e.g., calcium salt, magnesium salt, etc.), an ammonium salt; a salt with an organic base, for example, an organic amine salt (e.g., triethylamine salt, pyridine salt, picoline salt, ethanolamine salt, triethanolamine salt, dicyclohexylamine salt, N,N'-dibenzylethylenediamine salt, etc.); an inorganic acid addition salt (e.g., hydrochloride, hydrobromide, sulfate, phosphate, etc.); an organic carboxylic sulfonic acid addition salt (e.g., formate, acetate, trifluoroacetate, maleate, tartrate, fumarate, methanesulfonate, benzenesulfonate, toluenesulfonate, etc.); a salt with a basic or acidic amino acid (e.g., arginine, aspartic acid, glutamic acid, etc.).

In the above and subsequent descriptions of the present specification, suitable examples and illustration of the various definitions which the present invention intends to include within the scope thereof are explained in detail as follows.

The term "lower" is used to intend a group having 1 to 6 carbon atom(s), unless otherwise provided.

The term "higher" is used to intend a group having 7 to 20 carbon atoms, unless otherwise provided.

Suitable example of "one or more" may be the number of 1 to 6, in which the preferred one may be the number of 1 to 3.

Suitable example of "lower alkanoyl" may include

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straight or branched one such as formyl, acetyl, 2-methylacetyl, 2,2-dimethylacetyl, propionyl, butyryl, isobutyryl, pentanoyl, 2,2-dimethylpropionyl, hexanoyl, and the like.

- 5            Suitable example of "suitable substituent(s)" in the groups such as "lower alkanoyl substituted with unsaturated 6-membered heteromonocyclic group containing at least one nitrogen atom which may have one or more
- 10           suitable substituent(s)", "lower alkanoyl substituted with 1,2,3,4-tetrahydroisoquinoline which may have one or more suitable substituent(s)", etc. may include lower alkoxy as mentioned below, higher alkoxy as mentioned below, lower alkyl as mentioned below, higher alkyl as mentioned below, higher alkoxy(lower)alkyl, lower alkoxycarbonyl, oxo, aryl
- 15           which may have one or more lower alkoxy, aryl which may have one or more higher alkoxy, aryl which may have one or more lower alkyl, aryl which may have one or more higher alkyl, aryl substituted with aryl which may have one or more lower alkoxy, aryl substituted with aryl which may
- 20           have one or more higher alkoxy, aryl substituted with aryl which may have one or more lower alkyl, aryl substituted with aryl which may have one or more higher alkyl, aroyl which may have one or more lower alkoxy, aroyl which may have one or more higher alkoxy, aroyl which may have one
- 25           or more lower alkyl, aroyl which may have one or more higher alkyl, heterocyclic group which may have one or more lower alkoxy, heterocyclic group which may have one or more higher alkoxy, aryl having heterocyclic(higher)alkoxy, heterocyclic group which may
- 30           have aryl having higher alkoxy, heterocyclic group which may have aryl having lower alkoxy(higher)alkoxy, heterocyclic group which may have aryl having lower alkoxy, lower alkoxy(lower)alkyl, halo(lower)alkoxy, lower alkenyloxy, halo(higher)alkoxy, lower
- 35           alkoxy(higher)alkoxy, aryl which may have one or more

lower alkoxy(lower)alkoxy, heterocyclic group, aryl which  
may have one or more lower alkoxy(higher)alkoxy, aryl  
which may have one or more higher alkenyloxy,  
cyclo(lower)alkyl which may have aryl, aryl substituted  
5 with heterocyclic group which may have lower alkyl and  
oxo, cyclo(lower)alkyl which may have one or more lower  
alkyl, aryl which may have cyclo(lower)alkyl, aryl which  
may have heterocyclic group, and the like.

Suitable example of "lower alkoxy" may include  
10 straight or branched one such as methoxy, ethoxy, propoxy,  
isopropoxy, butoxy, isobutoxy, tert-butoxy, pentyloxy,  
tert-pentyloxy, neo-pentyloxy, hexyloxy, isohexyloxy and  
the like,

Pl in which the preferred one may be methoxy, ethoxy,  
15 propoxy, butoxy, pentyloxy, hexyloxy and isohexyloxy.

Suitable example of "higher alkoxy" may include  
straight or branched one such as heptyloxy, octyloxy,  
3,5-dimethyloctyloxy, 3,7-dimethyloctyloxy, nonyloxy,  
decyloxy, undecyloxy, dodecyloxy, tridecyloxy,  
20 tetradecyloxy, hexadecyloxy, heptadecyloxy, octadecyloxy,  
nonadecyloxy, icosyloxy, and the like,

Pl in which the preferred one may be (C<sub>7</sub>-C<sub>14</sub>)alkoxy, and the  
more preferred one may be heptyloxy and octyloxy.

Suitable example of "lower alkyl" may include  
25 straight or branched one having 1 to 6 carbon atom(s),  
such as methyl, ethyl, propyl, isopropyl, butyl, isobutyl,  
sec-butyl, tert-butyl, pentyl, tert-pentyl, neo-pentyl,  
hexyl, isohexyl and the like,

Pl in which the preferred one may be methyl, pentyl, hexyl  
30 and isohexyl.

Suitable example of "higher alkyl" may include  
straight or branched one having 7 to 20 carbon atoms, such  
as heptyl, octyl, 3,5-dimethyloctyl, 3,7-dimethyloctyl,  
nonyl, decyl, undecyl, dodecyl, tridecyl, tetradecyl,  
35 pentadecyl, hexadecyl, heptadecyl, octadecyl, nonadecyl,

icosyl, and the like,

P1 in which the preferred one may be (C<sub>7</sub>-C<sub>14</sub>)alkyl, and the more preferred one may be heptyl, octyl, nonyl and decyl.

Suitable example of "aryl" and "ar" moiety may include phenyl which may have lower alkyl (e.g., phenyl, mesityl, tolyl, etc.), naphthyl, anthryl, and the like,

P1 in which the preferred one may be phenyl and naphthyl.

Suitable example of "aroyl" may include benzoyl, toluoyl, naphthoyl, anthrylcarbonyl, and the like,

10 P1 in which the preferred one may be benzoyl and naphthoyl.

Suitable example of "heterocyclic group" and "heterocyclic" moiety may include

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P1 unsaturated 3 to 8-membered (more preferably 5 or 6-membered) heteromonocyclic group containing 1 to 4 nitrogen atom(s), for example, pyrrolyl, pyrrolinyl, imidazolyl, pyrazolyl, pyridyl, dihydropyridyl, pyrimidyl, pyrazinyl, pyridazinyl, triazolyl (e.g., 4H-1,2,4-triazolyl, 1H-1,2,3-triazolyl, 2H-1,2,3-triazolyl, etc.),  
20 tetrazolyl (e.g., 1H-tetrazolyl, 2H-tetrazolyl, etc.), etc.;

P1 saturated 3 to 8-membered (more preferably 5 or 6-membered) heteromonocyclic group containing 1 to 4 nitrogen atom(s), for example, pyrrolidinyl, imidazolidinyl, piperidyl, piperazinyl, etc.;

P1 unsaturated condensed heterocyclic group containing 1 to 4 nitrogen atom(s), for example, indolyl, isoindolyl, indolinyl, indolizinyl, benzimidazolyl, quinolyl, isoquinolyl, indazolyl, benzotriazolyl, etc.;

30 P1 unsaturated 3 to 8-membered (more preferably 5 or 6-membered) heteromonocyclic group containing 1 to 2 oxygen atom(s) and 1 to 3 nitrogen atom(s), for example, oxazolyl, isoxazolyl, oxadiazolyl (e.g., 1,2,4-oxadiazolyl, 1,3,4-oxadiazolyl, 1,2,5-oxadiazolyl, etc.),  
35 etc.;

- P1 saturated 3 to 8-membered (more preferably 5 or 6-membered) heteromonocyclic group containing 1 to 2 oxygen atom(s) and 1 to 3 nitrogen atom(s), for example, morpholinyl, sydnonyl, etc.;
- 5 P1 unsaturated condensed heterocyclic group containing 1 to 2 oxygen atom(s) and 1 to 3 nitrogen atom(s), for example, benzoxazolyl, benzoxadiazolyl, etc.;
- P1 unsaturated 3 to 8-membered (more preferably 5 or 6-membered) heteromonocyclic group containing 1 to 2 sulfur atom(s) and 1 to 3 nitrogen atom(s), for example, 10 thiazolyl, isothiazolyl, thiadiazolyl (e.g., 1,2,3-thiadiazolyl, 1,2,4-thiadiazolyl, 1,3,4-thiadiazolyl, 1,2,5-thiadiazolyl, etc.), dihydrothiazinyl, etc.;
- P1 saturated 3 to 8-membered (more preferably 5 or 6-membered) heteromonocyclic group containing 1 to 2 sulfur atom(s) and 1 to 3 nitrogen atom(s), for example, 15 thiazolidinyl, etc.;
- P1 unsaturated 3 to 8-membered (more preferably 5 or 6-membered) heteromonocyclic group containing 1 to 2 sulfur atom(s), for example, thienyl, dihydrodithiynyl, 20 dihydrodithionyl, etc.;
- P1 unsaturated condensed heterocyclic group containing 1 to 2 sulfur atom(s) and 1 to 3 nitrogen atom(s), for example, benzothiazolyl, benzothiadiazolyl, etc.;
- 25 P1 unsaturated 3 to 8-membered (more preferably 5 or 6-membered) heteromonocyclic group containing an oxygen atom, for example, furyl, etc.;
- P1 saturated 3 to 8-membered (more preferably 5 or 6-membered) heteromonocyclic group containing an oxygen atom, for example, tetrahydrofuran, tetrahydropyran, etc.;
- 30 P1 unsaturated 3 to 8-membered (more preferably 5 or 6-membered) heteromonocyclic group containing an oxygen atom and 1 to 2 sulfur atom(s), for example, dihydrooxathiinyl, etc.;
- 35 P1 unsaturated condensed heterocyclic group containing 1

to 2 sulfur atom(s), for example, benzothienyl, benzodithienyl, etc.;

11 unsaturated condensed heterocyclic group containing an oxygen atom and 1 to 2 sulfur atom(s), for example, benzoxathienyl, etc.; and the like.

Suitable example of "halo" may include fluoro, chloro, bromo and iodo.

Suitable example of "lower alkenyloxy" may include vinyloxy, 1-(or 2-)propenyloxy, 1-(or 2- or 3-)butenyloxy, 1-(or 2- or 3- or 4-)pentyloxy, 1-(or 2- or 3- or 4- or 5-)hexenyloxy, and the like, in which the preferred one may be (C<sub>2</sub>-C<sub>6</sub>)alkenyloxy, and the most preferred one may be 5-hexenyloxy.

Suitable example of "higher alkenyloxy" may include (C<sub>7</sub>-C<sub>20</sub>)alkenyloxy, in which the preferred one may be 6-heptenyloxy and 7-octenyloxy.

Suitable example of "cyclo(lower)alkyl" may include cyclopropyl, cyclobutyl, cyclopentyl, cyclohexyl, and the like, in which the preferred one may be cyclo(C<sub>4</sub>-C<sub>6</sub>)alkyl, and the most preferred one may be cyclohexyl.

Suitable example of "higher alkanoyl" may include heptanoyl, octanoyl, nonanoyl, decanoyl, undecanoyl, lauroyl, tridecanoyl, tetradecanoyl, pentadecanoyl, hexadecanoyl, heptadecanoyl, octadecanoyl, nonadecanoyl, icosanoyl, and the like, in which the preferred one may be (C<sub>7</sub>-C<sub>20</sub>)alkanoyl, and the most preferred one may be hexadecanoyl.

Suitable example of "ar(lower)alkyl" may include benzyl, phenethyl, phenylpropyl, phenylbutyl, phenylpentyl, phenylhexyl, naphthylmethyl, naphthylethyl, naphthylpropyl, naphthylbutyl, naphthylpentyl, naphthylhexyl, and the like, in which the preferred one may be phenyl(C<sub>1</sub>-C<sub>4</sub>)alkyl, and the most preferred one may be benzyl.



Suitable example of "protected amino" may include lower or higher alkoxycarbonylamino (e.g., methoxycarbonylamino, ethoxycarbonylamino, t-butoxycarbonylamino, t-pentyloxycarbonylamino, heptyloxycarbonylamino, etc.), ar(lower)alkoxycarbonylamino (e.g., phenyl(lower)alkoxycarbonylamino (e.g., benzyloxycarbonylamino, etc.), etc.), an amino group substituted with a conventional protecting group such as ar(lower)alkyl which may have suitable substituent(s) (e.g., benzyl, trityl, etc.) and the like, in which the preferred one may be phenyl(lower)alkoxycarbonylamino, and the most preferred one may be benzyloxycarbonylamino.

Suitable example of "lower alkanoyl" in the term of "lower alkanoyl substituted with unsaturated 6-membered heteromonocyclic group containing at least one nitrogen atom which may have one or more suitable substituent(s)" can be referred to aforementioned "lower alkanoyl", in which the preferred one may be (C<sub>1</sub>-C<sub>4</sub>)alkanoyl, and the more preferred one may be formyl.

Suitable example of "unsaturated 6-membered heteromonocyclic group containing at least one nitrogen atom" in the term of "lower alkanoyl substituted with unsaturated 6-membered heteromonocyclic group containing at least one nitrogen atom which may have one or more suitable substituent(s)" may include pyridyl, dihydropyridyl, pyrimidyl, pyrazinyl, pyridazinyl, triazinyl (e.g., 4H-1,2,4-triazinyl, 1H-1,2,3-triazinyl, etc.), tetrazinyl (e.g., 1,2,4,5-tetrazinyl, 1,2,3,4-tetrazinyl, etc.), and the like, in which the preferred one may be unsaturated 6-membered heteromonocyclic group containing 1 to 3 nitrogen atom(s), and the most preferred one may be pyridyl and pyridazinyl.

Suitable example of "suitable substituent(s)" in the

term of "lower alkanoyl substituted with unsaturated  
6-membered heteromonocyclic groups containing at least one  
nitrogen atom which may have one or more suitable  
substituent(s)" can be referred to aforementioned  
5 "suitable substituent(s)",

Pl in which the preferred one may be higher alkoxy, higher  
alkoxy(lower)alkyl, heterocyclic group which may have aryl  
having higher alkoxy, aryl which may have one or more  
higher alkoxy, aryl substituted with aryl which may have  
10 lower alkoxy, heterocyclic group which may have aryl  
having lower alkoxy(higher)alkoxy, and heterocyclic group  
which may have aryl having lower alkoxy, and the more  
preferred one may be (C<sub>7</sub>-C<sub>14</sub>)alkoxy, (C<sub>7</sub>-C<sub>14</sub>)alkoxy-  
(C<sub>1</sub>-C<sub>4</sub>)alkyl, 3 to 8-membered saturated heteromonocyclic  
15 group containing at least one nitrogen atom which may have  
phenyl having 1 to 3 (C<sub>7</sub>-C<sub>14</sub>)alkoxy, phenyl which may have  
1 to 3 (C<sub>7</sub>-C<sub>14</sub>)alkoxy, phenyl substituted with phenyl  
which may have 1 to 3 (C<sub>3</sub>-C<sub>6</sub>)alkoxy, 3 to 8-membered  
saturated heteromonocyclic group containing at least one  
20 nitrogen atom which may have phenyl having (C<sub>1</sub>-C<sub>4</sub>)-  
alkoxy(C<sub>7</sub>-C<sub>14</sub>)alkoxy, and 3 to 8-membered saturated  
heteromonocyclic group containing at least one nitrogen  
atom which may have phenyl having 1 to 3 (C<sub>3</sub>-C<sub>6</sub>)alkoxy,  
and the most preferred one may be octyloxy,  
25 octyloxymethyl, piperazinyl which has phenyl having  
heptyloxy or octyloxy, phenyl having heptyloxy, phenyl  
substituted with phenyl having butoxy, piperazinyl which  
has phenyl having methoxyoctyloxy, and piperazinyl which  
has phenyl having hexyloxy.

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Suitable example of "lower alkanoyl" in the term of  
"lower alkanoyl substituted with 1,2,3,4-tetra-  
hydroisoquinoline which may have one or more suitable  
substituent(s)" can be referred to aforementioned "lower  
35 alkanoyl",

Pl in which the preferred one may be (C<sub>1</sub>-C<sub>4</sub>)-  
alkanoyl, and the more preferred one may be formyl.

Suitable example of "suitable substituent(s)" in the  
term of "lower alkanoyl substituted with 1,2,3,4-  
5 tetrahydroisoquinoline which may have one or more suitable  
substituent(s)" can be referred to aforementioned  
"suitable substituent(s)",

Pl in which the preferred one may be lower alkoxy, higher  
alkoxy, lower alkyl, higher alkyl and lower  
10 alkoxycarbonyl, and the more preferred one may be  
(C<sub>7</sub>-C<sub>14</sub>)alkoxy and (C<sub>1</sub>-C<sub>4</sub>)alkoxycarbonyl, and the most  
preferred one may be octyloxy and tert-butoxycarbonyl.

Suitable example of "lower alkanoyl" in the term of  
15 "lower alkanoyl substituted with unsaturated condensed  
heterocyclic group containing at least one oxygen atom  
which may have one or more suitable substituent(s)" can be  
referred to aforementioned "lower alkanoyl",

Pl in which the preferred one may be (C<sub>1</sub>-C<sub>4</sub>)alkanoyl, and  
20 the more preferred one may be formyl.

Suitable example of "unsaturated condensed  
heterocyclic group containing at least one oxygen atom" in  
the term of "lower alkanoyl substituted with unsaturated  
condensed heterocyclic group containing at least one  
25 oxygen atom which may have one or more suitable  
substituent(s)" may include unsaturated condensed  
heterocyclic group containing one or more oxygen atom(s)  
and, optionally, another hetero atom(s) except oxygen  
atom,

30 Pl in which the preferred one may be unsaturated condensed  
heterocyclic group containing 1 to 3 oxygen atom(s),  
unsaturated condensed heterocyclic group containing 1 to 2  
oxygen atom(s) and 1 to 2 sulfur atom(s) and unsaturated  
condensed heterocyclic group 1 to 3 oxygen atom(s) and 1  
35 to 3 nitrogen atom(s), and the more preferred one may be

benzo[b]furanyl, isobenzofuranyl, chromenyl, xanthenyl, benzoxazolyl, benzoxadiazolyl, dihydrooxathiinyl, phenoxathiinyl, and the like, and the most preferred one may be benzo[b]furanyl, chromenyl and benzoxazolyl.

5           Suitable example of "suitable substituent(s)" in the term of "lower alkanoyl substituted with unsaturated condensed heterocyclic group containing at least one oxygen atom which may have one or more suitable substituent(s)" can be referred to aforementioned  
10 "suitable substituent(s)",  
Pl in which the preferred one may be lower alkoxy, higher alkoxy, lower alkyl, higher alkyl, oxo, aryl which may have one or more lower alkoxy, heterocyclic group which may have one or more higher alkoxy, and aryl substituted  
15 with aryl which may have one or more lower alkyl, and the more preferred one may be (C<sub>7</sub>-C<sub>14</sub>)alkoxy, (C<sub>1</sub>-C<sub>4</sub>)alkyl, (C<sub>7</sub>-C<sub>14</sub>)alkyl, oxo, phenyl which may have 1 to 3 (C<sub>3</sub>-C<sub>6</sub>)alkoxy, unsaturated 6-membered heteromonocyclic group containing at least one nitrogen atom which may have  
20 1 to 3 (C<sub>7</sub>-C<sub>14</sub>)alkoxy, and phenyl substituted with phenyl which may have 1 to 3 (C<sub>3</sub>-C<sub>6</sub>)alkyl, and the most preferred one may be octyloxy, methyl, nonyl, oxo, phenyl having hexyloxy, pyridyl having octyloxy, and phenyl substituted with phenyl having hexyl.

25           Suitable example of "lower alkanoyl" in the term of "lower alkanoyl substituted with unsaturated condensed heterocyclic group containing 1 to 3 sulfur atom(s) which may have one or more suitable substituent(s)" can be  
30 referred to aforementioned "lower alkanoyl",

Pl in which the preferred one may be (C<sub>1</sub>-C<sub>4</sub>)alkanoyl, and the more preferred one may be formyl.

          Suitable example of "unsaturated condensed heterocyclic group containing 1 to 3 sulfur atom(s)" in  
35 the term of "lower alkanoyl substituted with unsaturated

condensed heterocyclic group containing 1 to 3 sulfur atom(s) which may have one or more suitable substituent(s)" may include unsaturated condensed heterocyclic group containing only 1 to 3 sulfur atom(s),  
5 Pl in which the preferred one may be benzothienyl and benzodithienyl, and the most preferred one may be benzothienyl.

Suitable example of "suitable substituent(s)" in the term of "lower alkanoyl substituted with unsaturated condensed heterocyclic group containing 1 to 3 sulfur atom(s) which may have one or more suitable substituent(s)" can be referred to aforementioned "suitable substituent(s)",

Pl in which the preferred one may be lower alkoxy, higher alkoxy, lower alkyl and higher alkyl, and more preferred one may be (C<sub>7</sub>-C<sub>14</sub>)alkoxy, and the most preferred one may be octyloxy.

Suitable example of "lower alkanoyl" in the term of "lower alkanoyl substituted with unsaturated condensed heterocyclic group containing 2 or more nitrogen atom(s) which may have one or more suitable substituent(s)" can be referred to aforementioned "lower alkanoyl",

Pl in which the preferred one may be (C<sub>1</sub>-C<sub>4</sub>)alkanoyl, and the most preferred one may be formyl.

Suitable example of "unsaturated condensed heterocyclic group containing 2 or more nitrogen atom(s)" in the term of "lower alkanoyl substituted with unsaturated condensed heterocyclic group containing 2 or more nitrogen atom(s) which may have one or more suitable substituent(s)" may include 1H-indazolyl, purinyl, phthalazinyl, benzoimidazolyl, naphthyridinyl, quinoxalinyl, quinazolyl, cinnolinyl, pteridinyl, and the like,

Pl in which the most preferred one may be benzoimidazolyl.

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substituent(s)" may include lower alkoxy, higher alkoxy,  
higher alkoxy(lower)alkyl, lower alkyl, higher alkyl, oxo,  
aryl which may have one or more lower alkoxy,  
aryl which may have one or more higher alkoxy,  
5 aryl which may have one or more lower alkyl,  
aryl which may have one or more higher alkyl,  
aroyl which may have one or more lower alkoxy,  
aroyl which may have one or more higher alkoxy,  
aroyl which may have one or more lower alkyl,  
10 aroyl which may have one or more higher alkyl,  
and the like,

Pl in which the preferred one may be  
aryl which may have one or more lower alkoxy,  
aryl which may have one or more higher alkoxy,  
15 aroyl which may have one or more lower alkoxy and  
aroyl which may have one or more higher alkoxy, and the  
more preferred one may be aryl which may have 1 to 3  
higher alkoxy and aroyl which may have 1 to 3 higher  
alkoxy, and the much more preferred one may be phenyl  
20 which may have 1 to 3 (C<sub>7</sub>-C<sub>14</sub>)alkoxy and naphthoyl which  
may have 1 to 3 (C<sub>7</sub>-C<sub>14</sub>)alkoxy, and the most preferred one  
may be phenyl which may have octyloxy and naphthoyl which  
may have heptyloxy.

25 Sutable example of "ar(lower)alkenoyl" in the term  
of "ar(lower)alkenoyl substituted with aryl which may have  
one or more suitable substituent(s)" may include  
phenyl(lower)alkenoyl (e.g., 3-phenylacryloyl, (2- or 3-  
or 4-)phenyl-(2- or 3-)butenoyl, 3-phenylmethacryloyl,  
30 (2- or 3- or 4- or 5-)phenyl-(2- or 3- or 4-)pentanoyl,  
(2- or 3- or 4- or 5- or 6-)phenyl-(2- or 3- or 4- or 5-)-  
hexanoyl, etc.), naphthyl(lower)alkenoyl (e.g.,  
3-naphthylacryloyl, (2- or 3- or 4-)naphthyl-(2- or  
3-)butenoyl, (2- or 3- or 4- or 5-)naphthyl-(2- or 3- or  
35 4-)pentanoyl, (2- or 3- or 4- or 5- or 6-)naphthyl-(2- or

3- or 4- or 5-)hexanoyl, etc.), and the like,

Pl in which the preferred one may be 3-phenylacryloyl and 3-methyl-3-phenylacryloyl.

Suitable example of "suitable substituent(s)" in the term of "ar(lower)alkenoyl substituted with aryl which may have one or more suitable substituent(s)" can be referred to aforementioned "suitable substituent(s)",

Pl in which the preferred one may be lower alkoxy, lower alkyl, higher alkyl, lower alkoxy(lower)alkyl, halo(lower)alkoxy, lower alkenyloxy, halo(higher)alkoxy, and lower alkoxy(higher)alkoxy and the much more preferred one may be (C<sub>1</sub>-C<sub>6</sub>)alkoxy, (C<sub>1</sub>-C<sub>6</sub>)alkyl, (C<sub>7</sub>-C<sub>14</sub>)alkyl, (C<sub>1</sub>-C<sub>4</sub>)alkoxy(C<sub>3</sub>-C<sub>6</sub>)alkyl, halo(C<sub>3</sub>-C<sub>6</sub>)alkoxy, (C<sub>3</sub>-C<sub>6</sub>)alkenyloxy, halo(C<sub>7</sub>-C<sub>14</sub>)alkoxy, and (C<sub>1</sub>-C<sub>4</sub>)alkoxy(C<sub>7</sub>-C<sub>14</sub>)alkoxy and the most preferred one may be pentyloxy, heptyl, pentyl, methoxyhexyl, fluoroheptyloxy, isohexyloxy, 5-hexenyloxy, haloheptyloxy, methoxyheptyloxy, methoxyoctyloxy, and butyloxy.

Suitable example of "naphthyl(lower)alkenoyl" in the term of "naphthyl(lower)alkenoyl which may have one or more higher alkoxy" may include 3-naphthylacryloyl, (2- or 3- or 4-)naphthyl-(2- or 3-)butenoyl, (2- or 3- or 4- or 5-)naphthyl-(2- or 3- or 4-)pentanoyl, (2- or 3- or 4- or 5- or 6-)naphthyl-(2- or 3- or 4- or 5-)hexanoyl, and the like,

Pl in which the preferred one may be 3-naphthylacryloyl.

Suitable example of "lower alkynoyl" in the term of "lower alkynoyl which may have one or more suitable substituent(s)" may include 2-propynoyl, (2- or 3-)butynoyl, (2- or 3- or 4-)pentynoyl, (2- or 3- or 4- or 5-)hexynoyl, and the like,

Pl in which the preferred one may be 2-propynoyl.

Suitable example of "suitable substituent(s)" in the



term of "lower alkynoyl which may have one or more suitable substituent(s)" can be referred to aforementioned "suitable substituent(s)",

Pl in which the preferred one may be aryl which may have one  
5 or more lower alkoxy, aryl which may have one or more higher alkoxy, aryl substituted with aryl which may have one or more lower alkyl and aryl substituted with aryl which may have one or more higher alkyl, and the more preferred one may be aryl substituted with aryl which may  
10 have 1 to 3 lower alkyl and aryl which may have 1 to 3 higher alkoxy, and the much more preferred one may be phenyl substituted with phenyl which may have 1 to 3 (C<sub>1</sub>-C<sub>6</sub>)alkyl and phenyl which may have 1 to 3 (C<sub>7</sub>-C<sub>14</sub>)alkoxy, and the most preferred one may be phenyl  
15 substituted with phenyl which may have pentyl and naphthyl which may have heptyloxy.

Suitable example of "ar(C<sub>2</sub>-C<sub>6</sub>)alkanoyl" in the term of "ar(C<sub>2</sub>-C<sub>6</sub>)alkanoyl substituted with aryl having one or  
20 more suitable substituent(s), in which ar(C<sub>2</sub>-C<sub>6</sub>)alkanoyl may have one or more suitable substituent(s)" may include phenyl(C<sub>2</sub>-C<sub>6</sub>)alkanoyl [e.g., phenylacetyl, (2- or 3-)-phenylpropanoyl, (2- or 3- or 4-)phenylbutanoyl, (2- or 3- or 4- or 5-)phenylpentanoyl, (2- or 3- or 4- or 5- or 6-)-  
25 phenylhexanoyl, etc.], naphthyl(C<sub>2</sub>-C<sub>6</sub>)alkanoyl [e.g. naphthylacetyl, (2- or 3-)naphthylpropanoyl, (2- or 3- or 4-)naphthylbutanoyl, (2- or 3- or 4- or 5-)-naphthylpentanoyl, (2- or 3- or 4- or 5- or 6-)-naphthylhexanoyl, etc.], and the like,

30 Pl in which the preferred one may be 2-phenylacetyl and 3-phenylpropanoyl.

Suitable example of "suitable substituent(s)" in the term of "ar(C<sub>2</sub>-C<sub>6</sub>)alkanoyl substituted with aryl having one or more suitable substituent(s), in which ar(C<sub>2</sub>-C<sub>6</sub>)-  
35 alkanoyl may have one or more suitable substituent(s)" may

include lower alkoxy, higher alkoxy, lower alkyl, higher alkyl, higher alkoxy(lower)alkyl, oxo, aryl having one or more lower alkoxy, aryl having one or more higher alkoxy, aryl having one or more lower alkyl, aryl having one or more higher alkyl, aryl substituted with aryl having one or more lower alkoxy, aryl substituted with aryl having one or more higher alkoxy, aryl substituted with aryl having one or more lower alkyl, aryl substituted with aryl having one or more higher alkyl, aryl having one or more lower alkoxy(lower)alkoxy and the like,

Pl in which the preferred one may be lower alkoxy, higher alkoxy, lower alkyl, higher alkyl, and phenyl having 1 to 3 lower alkoxy(lower)alkoxy and the much more preferred one may be (C<sub>1</sub>-C<sub>6</sub>)alkoxy, (C<sub>1</sub>-C<sub>6</sub>)alkyl, (C<sub>7</sub>-C<sub>14</sub>)alkyl and phenyl having (C<sub>1</sub>-C<sub>4</sub>)alkoxy(C<sub>3</sub>-C<sub>6</sub>)alkoxy and the most preferred one may be pentyloxy, pentyl, heptyl and phenyl having methoxypentyloxy.

Suitable example of "suitable substituent(s)" in the term of "in which ar(C<sub>2</sub>-C<sub>6</sub>)alkanoyl may have one or more suitable substituent(s)" may be hydroxy, oxo, amino and aforementioned "protected amino".

Suitable example of "(C<sub>2</sub>-C<sub>6</sub>)alkanoyl" in the term of "(C<sub>2</sub>-C<sub>6</sub>)alkanoyl substituted with naphthyl having higher alkoxy" may include acetyl, propanoyl, butanoyl, pentanoyl, hexanoyl, and the like,

Pl in which the preferred one may be propanoyl.

Suitable example of "higher alkoxy" in the term of "(C<sub>2</sub>-C<sub>6</sub>)alkanoyl substituted with naphthyl having higher alkoxy" can be referred to aforementioned "higher alkoxy", in which the preferred one may be (C<sub>7</sub>-C<sub>14</sub>)alkoxy, and the most preferred one may be heptyloxy.

Suitable example of "aroyl" in the term of "aroyl substituted with heterocyclic group which may have one or

more suitable substituent(s), in which aroyl may have one or more suitable substituent(s)" may include benzoyl, toluoyl, naphthoyl, and the like,

P1 in which the preferred one may be benzoyl.

5

Suitable example of "heterocyclic group" in the term of "aroyl substituted with heterocyclic group which may have one or more suitable substituent(s), in which aroyl may have one or more suitable substituent(s)" may include  
10 unsaturated 3 to 8-membered (more preferably 5 or 6-membered) heteromonocyclic group containing 1 to 4 nitrogen atom(s), for example, pyrrolyl, pyrrolinyl, imidazolyl, pyrazolyl, pyridyl, dihydropyridyl, pyrimidyl, pyrazinyl, pyridazinyl, triazolyl (e.g., 4H-1,2,4-  
15 triazolyl, 1H-1,2,3-triazolyl, 2H-1,2,3-triazolyl, etc.), tetrazolyl (e.g., 1H-tetrazolyl, 2H-tetrazolyl, etc.), etc.;

P1 saturated 3 to 8-membered (more preferably 5 or 6-membered) heteromonocyclic group containing 1 to 4  
20 nitrogen atom(s), for example, pyrrolidinyl, imidazolidinyl, piperidyl, piperazinyl, etc.;

P1 unsaturated condensed heterocyclic group containing 1 to 4 nitrogen atom(s), for example, indolyl, isoindolyl, indolinyl, indolizinyl, benzimidazolyl, quinolyl,  
25 isoquinolyl, indazolyl, benzotriazolyl, etc.;

P1 unsaturated 3 to 8-membered (more preferably 5 or 6-membered) heteromonocyclic group containing 1 to 2 oxygen atom(s) and 1 to 3 nitrogen atom(s), for example, oxazolyl, isoxazolyl, oxadiazolyl (e.g.,  
30 1,2,4-oxadiazolyl, 1,3,4-oxadiazolyl, 1,2,5-oxadiazolyl, etc.), etc.;

P1 saturated 3 to 8-membered (more preferably 5 or 6-membered) heteromonocyclic group containing 1 to 2 oxygen atom(s) and 1 to 3 nitrogen atom(s), for example,  
35 morpholinyl, sydnonyl, etc.;

¶1 unsaturated 3 to 8-membered (more preferably 5 or 6-membered) heteromonocyclic group containing 1 to 2 sulfur atom(s) and 1 to 3 nitrogen atom(s), for example, thiazolyl, isothiazolyl, thiadiazolyl (e.g., 1,2,3-thiadiazolyl, 1,2,4-thiadiazolyl, 1,3,4-thiadiazolyl, 1,2,5-thiadiazolyl, etc.), dihydrothiazinyl, etc.;

¶1 unsaturated 3 to 8-membered (more preferably 5 or 6-membered) heteromonocyclic group containing 1 to 2 sulfur atom(s), for example, thienyl, dihydrodithiynyl, dihydrodithionyl, etc.;

P1 unsaturated 3 to 8-membered (more preferably 5 or 6-membered) heteromonocyclic group containing an oxygen atom, for example, furyl, etc.;

P1 unsaturated 3 to 8-membered (more preferably 5 or 6-membered) heteromonocyclic group containing an oxygen atom and 1 to 2 sulfur atom(s), for example, dihydrooxathiinyl, etc.;

35 P1 unsaturated condensed heterocyclic group containing

an oxygen atom and 1 to 2 sulfur atom(s), for example, benzoxathiinyl, etc.; and the like,

5 P1 in which the preferred one may be saturated 3 to 8-membered heteromonocyclic group containing 1 to 4 nitrogen atom(s), unsaturated 3 to 8-membered heteromonocyclic group containing 1 to 2 oxygen atom(s) and 1 to 3 nitrogen atom(s),

P1 unsaturated 3 to 8-membered heteromonocyclic group containing 1 to 4 nitrogen atom(s), and

10 P1 unsaturated 3 to 8-membered heteromonocyclic group containing 1 to 2 sulfur atom(s) and 1 to 3 nitrogen atom(s), and the most preferred one may be piperazinyl, isoxazolyl, oxadiazolyl, thiadiazolyl, pyrazolyl, piperidyl, oxazolyl and pyrimidyl.

15

Suitable example of "suitable substituent(s)" in the term of "aroyl substituted with heterocyclic group which may have one or more suitable substituent(s), in which aroyl may have one or more suitable substituent(s)", can

20 be referred to aforementioned "suitable substituent(s)",

P1 in which the preferred one may be aryl which may have 1 to 3 higher alkoxy, aryl which may have 1 to 3 lower alkoxy, higher alkyl, heterocyclic group, aryl which may have 1 to 3 lower alkoxy(higher)alkoxy, aryl which may

25 have higher alkenyloxy, heterocyclic group which may have aryl having lower alkoxy, cyclo(lower)alkyl which may have aryl, aryl which may have 1 to 3 lower alkyl, aryl which may have cyclo(lower)alkyl, aryl which may have higher alkenyloxy, aryl substituted with heterocyclic group which

30 may have lower alkyl and oxo, cyclo(lower)alkyl which may have lower alkyl, aryl substituted with aryl which may have 1 to 3 lower alkoxy, and aryl which may have heterocyclic group, and the more preferred one may be phenyl which may have 1 to 3 (C<sub>7</sub>-C<sub>14</sub>)alkoxy, phenyl which

35 may have 1 to 3 (C<sub>3</sub>-C<sub>6</sub>)alkoxy, (C<sub>7</sub>-C<sub>14</sub>)alkyl, saturated 3

to 8-membered heteromonocyclic group containing 1 to 4  
nitrogen atom(s), phenyl which may have 1 to 3 (C<sub>1</sub>-  
C<sub>4</sub>)alkoxy (C<sub>7</sub>-C<sub>14</sub>)alkoxy, phenyl which may have (C<sub>7</sub>-  
C<sub>14</sub>)alkenyloxy, saturated 3 to 8-membered heteromonocyclic  
5 group containing 1 to 4 nitrogen atom(s) substituted with  
phenyl having (C<sub>3</sub>-C<sub>6</sub>)alkoxy, cyclo(C<sub>3</sub>-C<sub>6</sub>)alkyl which may  
have phenyl, phenyl which may have 1 to 3 (C<sub>3</sub>-C<sub>6</sub>)alkyl,  
phenyl which may have cyclo(C<sub>3</sub>-C<sub>6</sub>)alkyl, phenyl which may  
have (C<sub>7</sub>-C<sub>14</sub>)alkenyloxy, phenyl substituted with  
10 heterocyclic group which may have (C<sub>3</sub>-C<sub>6</sub>)alkyl and oxo,  
cyclo(C<sub>3</sub>-C<sub>6</sub>)alkyl which may have (C<sub>3</sub>-C<sub>6</sub>)alkyl, phenyl  
substituted with phenyl which may have 1 to 3 (C<sub>1</sub>-  
C<sub>4</sub>)alkoxy, and phenyl which may have 3 to 8-membered  
heteromonocyclic group containing 1 to 4 nitrogen atom(s),  
15 and the most preferred one may be phenyl having octyloxy,  
phenyl having pentyloxy, phenyl having hexyloxy, heptyl,  
piperidyl, phenyl having isohexyloxy, phenyl having  
heptyloxy, phenyl having methoxyheptyloxy, phenyl having  
methoxyoctyloxy, phenyl having 6-heptenyloxy, piperidyl  
20 substituted with phenyl having hexyloxy, cyclohexyl having  
phenyl, phenyl having hexyl, phenyl having cyclohexyl,  
phenyl having 7-octenyloxy, phenyl substituted with  
triazolyl having lower alkyl and oxo, cyclohexyl having  
pentyl, phenyl having methoxyoctyloxy, nonyl, phenyl  
25 substituted with phenyl having propoxy, and phenyl having  
piperidine.

Suitable example of "suitable substituent(s)" in the  
term of "in which aroyl may have one or more suitable  
substituent(s)" may be halogen, in which the preferred one  
30 may be fluorine and chlorine.

Suitable example of "aroyl" in the term of "aroyl  
substituted with aryl having heterocyclic(hetero)alkoxy,  
in which heterocyclic group may have one or more suitable  
35 substituent(s)" may include benzoyl, toluoyl, naphthoyl,

anthrylcarbonyl and the like,

Pl in which the preferred one may be benzoyl.

Suitable example of "heterocyclic" moiety in the term of "aroyl substituted with aryl having  
5 heterocyclic(higher)alkoxy, in which heterocyclic group may have one or more suitable substituent(s)" can be referred to the ones as exemplified before for "heterocyclic group" in the term of "aroyl substituted with heterocyclic group which may have one or more  
10 suitable substituent(s)",

Pl in which the preferred one may be unsaturated 3 to 8-membered heteromonocyclic group containing 1 to 4 nitrogen atom(s) and saturated 3 to 8-membered heteromonocyclic group containing 1 to 2 oxygen atom(s) and 1 to 3 nitrogen  
15 atom(s), and the most preferred one may be triazolyl, tetrazolyl and morpholinyl.

Suitable example of "(higher)alkoxy" moiety in the term of "aroyl substituted with aryl having heterocyclic(higher)alkoxy, in which heterocyclic group  
20 may have one or more suitable substituent(s)" can be referred to aforementioned "higher alkoxy",

Pl in which the preferred one may be (C<sub>7</sub>-C<sub>14</sub>)alkoxy, and the most preferred one may be octyloxy.

Suitable example of "aryl" in the term of "aroyl substituted with aryl having heterocyclic(higher)alkoxy, in which heterocyclic group may have one or more suitable substituent(s)" can be referred to aforementioned "aryl",

Pl in which the preferred one may be phenyl.

Suitable example of "suitable substituent(s)" in the term of "in which heterocyclic group may have one or more suitable substituent(s)" may be lower alkyl, in which the preferred one may be methyl.

Suitable example of "aroyl" in the term of "aroyl substituted with aryl having lower alkoxy(higher)alkoxy"

may include benzoyl, toluoyl, naphthoyl, anthrylcarbonyl and the like,

Pl in which the preferred one may be benzoyl.

Suitable example of "aryl" in the term of "aroyl substituted with aryl having lower alkoxy(higher)alkoxy" can be referred to aforementioned "aryl",

Pl in which the preferred one may be phenyl.

Suitable example of "lower alkoxy(higher)alkoxy" in the term of "aroyl substituted with aryl having lower alkoxy(higher)alkoxy" may be methoxyheptyloxy, methoxyoctyloxy, methoxynonyloxy, methoxydecyloxy, ethoxyheptyloxy, ethoxyoctyloxy, ethoxynonyloxy, ethoxydecyloxy, ethoxyundecyloxy, propoxyundecyloxy, butoxydodecyloxy, pentyloxytridecyloxy, hexyloxytetradecyloxy, propoxyheptyloxy, propoxyoctyloxy, propoxynonyloxy, butoxydecyloxy, or the like, in which the preferred one may be (C<sub>1</sub>-C<sub>6</sub>)alkoxy(C<sub>7</sub>-C<sub>14</sub>)alkoxy, and the more preferred one may be methoxyoctyloxy.

Suitable example of "aroyl" in the term of "aroyl substituted with aryl having lower alkenyl(lower)alkoxy" may include benzoyl, toluoyl, naphthoyl, anthrylcarbonyl and the like,

Pl in which the preferred one may be benzoyl.

Suitable example of "aryl" in the term of "aroyl substituted with aryl having lower alkenyl(lower)alkoxy" can be referred to aforementioned "aryl",

Pl in which the preferred one may be phenyl.

Suitable example of "lower alkenyl(lower)alkoxy" in the term of "aroyl substituted with aryl having lower alkenyl(lower)alkoxy" may be vinylmethoxy, vinylethoxy, vinylpropoxy, vinylbutoxy, vinylpentyloxy, vinylhexyloxy, 1-(or 2-)propenylmethoxy, 1-(or 2-)propenylethoxy, 1-(or 2-)propenylpropoxy, 1-(or 2-)propenylbutoxy, 1-(or 2-)propenylpentyloxy, 1-(or 2-)propenylhexyloxy, 1-(or 2- or



3-)butenylbutoxy, 1-(or 2- or 3-)butenylhexyloxy, 1-(or 2-  
or 3- or 4-)pentenylpentyloxy, 1-(or 2- or 3- or 4)-  
pentenylhexyloxy, 1-(or 2- or 3- or 4- or 5)-  
hexenylbutoxy, 1-(or 2- or 3- or 4- or 5-)hexenylhexyloxy,  
5 or the like,

P1 in which the preferred one may be (C<sub>2</sub>-C<sub>6</sub>)alkenyl(C<sub>1</sub>-  
C<sub>6</sub>)alkoxy, and the more preferred one may be  
vinylhexyloxy.

10 Sutable example of "aroyl substituted with 2 lower  
alkoxy" may include benzoyl substituted with 2 lower  
alkoxy and naphthoyl substituted with 2 lower alkoxy,

P1 in which the preferred one may be benzoyl substituted  
with 2 (C<sub>1</sub>-C<sub>6</sub>)alkoxy, and the most preferred one may be  
15 benzoyl substituted with 2 pentyloxy.

Sutable example of "aroyl substituted with aryl  
having lower alkyl" may include benzoyl substituted with  
phenyl having lower alkyl, benzoyl substituted with  
20 naphthyl having lower alkyl, naphthoyl substituted with  
phenyl having lower alkyl, naphthoyl substituted with  
naphthyl having lower alkyl, and the like,

P1 in which the preferred one may be benzoyl substituted  
with phenyl having (C<sub>1</sub>-C<sub>6</sub>)alkyl, and the most preferred  
25 one may be benzoyl substituted with phenyl having hexyl  
and benzoyl substituted with phenyl having pentyl.

Sutable example of "aroyl substituted with aryl  
having higher alkyl" may include benzoyl substituted with  
30 phenyl having higher alkyl, benzoyl substituted with  
naphthyl having higher alkyl, naphthoyl substituted with  
phenyl having higher alkyl, naphthoyl substituted with  
naphthyl having higher alkyl, and the like,

P1 in which the preferred one may be benzoyl substituted  
35 with phenyl having (C<sub>7</sub>-C<sub>14</sub>)alkyl, and the most preferred

one may be benzoyl substituted with phenyl having heptyl.

Suitable example of "aryloxy" moiety in the term of "aryloxy(lower)alkanoyl which may have one or more  
5 suitable substituent(s)" may include phenoxy, mesityloxy, tolyloxy, naphthyloxy, anthryloxy, and the like,  
P1 in which the preferred one may be phenoxy.

Suitable example of "lower alkanoyl" moiety in the term of "aryloxy(lower)alkanoyl which may have one or more  
10 suitable substituent(s)" can be referred to aforementioned "lower alkanoyl",

P1 in which the preferred one may be formyl, acetyl, 2,2-dimethylacetyl, propionyl, butyryl, isobutyryl and  
15 pentanoyl, hexanoyl, and the more preferred one may be (C<sub>1</sub>-C<sub>6</sub>)alkanoyl, and the much more preferred one may be formyl, acetyl, propionyl and 2,2-dimethylacetyl.

Suitable example of "suitable substituent(s)" in the term of "aryloxy(lower)alkanoyl which may have one or more  
20 suitable substituent(s)" can be referred to aforementioned "suitable substituent(s)",

P1 in which the preferred one may be (C<sub>7</sub>-C<sub>14</sub>)alkoxy, and the more preferred one may be octyloxy.

Suitable example of "ar(lower)alkoxy" moiety in the  
25 term of "ar(lower)alkoxy(lower)alkanoyl which may have one or more suitable substituent(s)" may include phenyl(lower)alkoxy [e.g., phenylmethoxy, (1- or 2-)-phenylethoxy, phenylpropoxy, 2-phenyl-1-methylpropoxy, 3-phenyl-2,2-dimethylpropoxy,  
30 (1- or 2- or 3- or 4-)phenylbutoxy, (1- or 2- or 3- or 4- or 5-)phenylpentyloxy, (1- or 2- or 3- or 4- or 5- or 6-phenylhexyloxy, etc.], naphthyl(lower)alkoxy [e.g. naphthylmethoxy, (1- or 2-)naphthylethoxy,  
1-naphthylpropoxy, 2-naphthyl-1-methylpropoxy, 3-naphthyl-  
35 2,2-dimethylpropoxy, (1- or 2- or 3- or 4-)naphthylbutoxy,

(1- or 2- or 3- or 4- or 5-)naphthylpentyloxy, (1- or 2- or 3- or 4- or 5- or 6-)naphthylhexyloxy, etc.], and the like,

5 P<sup>1</sup> in which the preferred one may be naphthyl(C<sub>1</sub>-C<sub>4</sub>)alkoxy, and the more preferred one may be naphthylmethoxy.

Suitable example of "(lower)alkanoyl" moiety in the term of "ar(lower)alkoxy(lower)alkanoyl which may have one or more suitable substituent(s)" can be referred to aforementioned "lower alkanoyl",

10 P<sup>1</sup> in which the preferred one may be (C<sub>1</sub>-C<sub>4</sub>)alkanoyl, and the more preferred one may be formyl.

Suitable example of "suitable substituent(s)" in the term of "ar(lower)alkoxy(lower)alkanoyl which may have one or more suitable substituent(s)" can be referred to aforementioned "suitable substituent(s)",

15 P<sup>1</sup> in which the preferred one may be lower alkoxy, higher alkoxy, lower alkyl and higher alkyl, and the more preferred one may be higher alkoxy, and the much more preferred one may be (C<sub>7</sub>-C<sub>14</sub>)alkoxy, and the most preferred one may be heptyloxy.

Suitable example of "arylamino" moiety in the term of "arylamino(lower)alkanoyl which may have one or more suitable substituent(s)" may include phenylamino, mesitylamino, tolylamino, naphthylamino, anthrylamino and the like,

25 P<sup>1</sup> in which the preferred one may be phenylamino and naphthylamino.

Suitable example of "lower alkanoyl" moiety in the term of "arylamino(lower)alkanoyl which may have one or more suitable substituent(s)" can be referred to aforementioned "lower alkanoyl",

30 P<sup>1</sup> in which the preferred one may be (C<sub>1</sub>-C<sub>4</sub>)alkanoyl, and the more preferred one may be formyl.

35 Suitable example of "suitable substituent(s)" in the

term of "arylamino(lower)alkanoyl which may have one or more suitable substituent(s)" can be referred to aforementioned "suitable substituent(s)",

P1 in which the preferred one may be lower alkoxy, higher alkoxy, lower alkyl, higher alkyl, aryl which may have 1 to 3 lower alkoxy and aryl which may have 1 to 3 higher alkoxy, and the more preferred one may be (C<sub>7</sub>-C<sub>14</sub>)alkoxy, and phenyl which may have 1 to 3 (C<sub>7</sub>-C<sub>14</sub>)alkoxy, and the most preferred one may be heptyloxy and phenyl which may have heptyloxy.

Suitable example of "lower alkanoyl" in the term of "lower alkanoyl substituted with pyrazolyl which has lower alkyl and aryl having higher alkoxy" can be referred to aforementioned "lower alkanoyl", in which the preferred one may be (C<sub>1</sub>-C<sub>4</sub>)alkanoyl, and the most preferred one may be formyl.

Suitable example of "lower alkyl" in the term of "lower alkanoyl substituted with pyrazolyl which has lower alkyl and aryl having higher alkoxy" can be referred to aforementioned "lower alkyl", in which the preferred one may be (C<sub>1</sub>-C<sub>4</sub>)alkyl, and the most preferred one may be methyl.

Suitable example of "aryl" in the term of "lower alkanoyl substituted with pyrazolyl which has lower alkyl and aryl having higher alkoxy" can be referred to aforementioned "aryl", in which the preferred one may be phenyl.

Suitable example of "higher alkoxy" in the term of "lower alkanoyl substituted with pyrazolyl which has lower alkyl and aryl having higher alkoxy" can be referred to aforementioned "higher alkoxy", in which the preferred one may be (C<sub>7</sub>-C<sub>14</sub>)alkoxy, and the most preferred one may be octyloxy.

Suitable example of "lower alkoxy(higher)alkanoyl" in

the term of "lower alkoxy(higher)alkanoyl, in which higher alkanoyl may have one or more suitable substituent(s)" may be (C<sub>1</sub>-C<sub>4</sub>)alkoxy(C<sub>7</sub>-C<sub>20</sub>)alkanoyl, in which the preferred one may be methoxyoctadecanoyl.

5        Suitable example of "suitable substituent(s)" in the term of "lower alkoxy(higher)alkanoyl, in which higher alkanoyl may have one or more suitable substituent(s)" may be amino and aforementioned "protected amino", in which the preferred one may be amino and  
10       ar(lower)alkoxycarbonylamino, and the most preferred one may be amino and benzyloxycarbonylamino.

      Suitable example of "aroyl" in the term of "aroyl substituted with aryl having heterocycloxy, in which  
15       heterocycloxy may have one or more suitable substituent(s)" can be referred to aforementioned "aroyl", in which the preferred one may be benzoyl.

      Suitable example of "aryl" in the term of "aroyl substituted with aryl having heterocycloxy, in which  
20       heterocycloxy may have one or more suitable substituent(s)" can be referred to aforementioned "aryl", in which the preferred one may be phenyl.

      Suitable example of "heterocyclic" moiety in the term of "aroyl substituted with aryl having heterocycloxy, in  
25       which heterocycloxy may have one or more suitable substituent(s)" can be referred to aforementioned "heterocyclic" moiety, in which the preferred one may be unsaturated 3 to 8-membered heteromonocyclic group containing 1 to 4 nitrogen atom(s), and the most preferred  
30       one may be pyridazinyl.

      Suitable example of "suitable substituent(s)" in the term of "aroyl substituted with aryl having  
heterocycloxy, in which heterocycloxy may have one or more suitable substituent(s)" may be aryl, in which the  
35       preferred one may be phenyl.

Suitable example of "aroyl" in the term of "aroyl substituted with cyclo(lower)alkyl having lower alkyl" can be referred to aforementioned "aroyl", in which the preferred one may be benzoyl.

5        Suitable example of "cyclo(lower)alkyl" in the term of "aroyl substituted with cyclo(lower)alkyl having lower alkyl" can be referred to aforementioned "cyclo(lower)alkyl", in which the preferred one may be cyclohexyl.

10        Suitable example of "lower alkyl" in the term of "aroyl substituted with cyclo(lower)alkyl having lower alkyl" can be referred to aforementioned "lower alkyl", in which the preferred one may be pentyl.

15        Suitable example of "higher alkyl" in the term of "indolylcarbonyl having higher alkyl" can be referred to aforementioned "higher alkyl", in which the preferred one may be decyl.

20        Suitable example of "lower alkyl" in the term of "naphthoyl having lower alkyl" can be referred to aforementioned "lower alkyl", in which the preferred one may be hexyl.

25        Suitable example of "higher alkyl" in the term of "naphthoyl having higher alkyl" can be referred to aforementioned "higher alkyl", in which the preferred one may be heptyl.

30        Suitable example of "lower alkoxy(higher)alkoxy" in the term of "naphthoyl having lower alkoxy(higher)alkoxy" may be (C<sub>1</sub>-C<sub>4</sub>)alkoxy(C<sub>7</sub>-C<sub>14</sub>)alkoxy, in which the preferred one may be methoxyoctyloxy.

35        Suitable example of "aroyl" in the term of "aroyl

substituted with aryl having lower  
alkoxy(lower)alkoxy(higher)alkoxy", "aroyl substituted  
with aryl having lower alkoxy(lower)alkoxy", "aroyl  
substituted with aryl which has aryl having lower alkoxy",  
5 "aroyl substituted with aryl which has aryl having lower  
alkoxy(lower)alkoxy", "aroyl substituted with aryl having  
heterocyclicoxy(higher)alkoxy", "aroyl substituted with  
aryl having aryloxy(lower)alkoxy" and "aroyl substituted  
with aryl having heterocycliccarbonyl(higher)alkoxy" can  
10 be referred to aforementioned "aroyl", in which the  
preferred one may be benzoyl.

Suitable example of "aryl" in abovementioned terms  
can be referred to aforementioned "aryl", in which the  
preferred one may be phenyl.

15

Suitable example of "lower alkoxy(lower)alkoxy-  
(higher)alkoxy" in the term of "aroyl substituted with  
aryl having lower alkoxy(lower)alkoxy(higher)alkoxy" may  
be (C<sub>1</sub>-C<sub>4</sub>)alkoxy(C<sub>1</sub>-C<sub>4</sub>)alkoxy(C<sub>7</sub>-C<sub>14</sub>)alkoxy, in which the  
20 preferred one may be ethoxyethoxyoctyloxy.

Suitable example of "lower alkoxy(lower)alkoxy" in  
the term of "aroyl substituted with aryl having lower  
alkoxy(lower)alkoxy" may be (C<sub>1</sub>-C<sub>4</sub>)alkoxy(C<sub>3</sub>-C<sub>6</sub>)alkoxy, in  
25 which the preferred one may be propoxyhexyloxy.

Suitable example of "lower alkoxy" in the term of  
"aroyl substituted with aryl which has phenyl having lower  
alkoxy" may be (C<sub>3</sub>-C<sub>6</sub>)alkoxy, in which the preferred one  
30 may be butoxy.

Suitable example of "lower alkoxy(lower)alkoxy" in  
the term of "aroyl substituted with aryl which has phenyl  
having lower alkoxy(lower)alkoxy" may be (C<sub>1</sub>-C<sub>4</sub>)alkoxy-  
35 (C<sub>3</sub>-C<sub>6</sub>)alkoxy, in which the preferred one may be

methoxypentyloxy and methoxyhexyloxy.

Suitable example of "heterocyclic" moiety in the term of "aroyl substituted with aryl having  
5 heterocyclicoxy(higher)alkoxy" can be referred to aforementioned "heterocyclic" moiety, in which the preferred one may be saturated 3 to 8-membered heteromonocyclic group containing an oxygen atom, and the most preferred one may be tetrahydropyranyl.

10 Suitable example of "higher alkoxy" moiety in the term of "aroyl substituted with aryl having heterocyclicoxy(higher)alkoxy" may be (C<sub>7</sub>-C<sub>14</sub>)alkoxy, in which the preferred one may be octyloxy.

15 Suitable example of "aryloxy(lower)alkoxy" in the term of "aroyl substituted with aryl having aryloxy(lower)alkoxy" may be phenoxy(C<sub>3</sub>-C<sub>6</sub>)alkoxy, in which the preferred one may be phenoxypentyloxy.

20 Suitable example of "heterocyclic" moiety in the term of "aroyl substituted with aryl having heterocycliccarbonyl(higher)alkoxy" can be referred to aforementioned "heterocyclic" moiety, in which the preferred one may be saturated 3 to 8-membered  
25 heteromonocyclic group containing 1 to 4 nitrogen atom(s), and the most preferred one may be piperidyl.

Suitable example of "higher alkoxy" moiety in the term of "aroyl substituted with aryl having heterocycliccarbonyl(higher)alkoxy" can be referred to  
30 aforementioned "higher alkoxy", in which the preferred one may be (C<sub>7</sub>-C<sub>14</sub>)alkoxy, and the most preferred one may be heptyloxy.

Suitable example of "lower alkanoyl" in the term of  
35 "lower alkanoyl substituted with oxazolyl which has aryl



having higher alkoxy" can be referred to aforementioned "lower alkanoyl", in which the preferred one may be (C<sub>1</sub>-C<sub>4</sub>)alkanoyl, and the most preferred one may be formyl.

5        Suitable example of "aryl" in the term of "lower alkanoyl substituted with oxazolyl which has aryl having higher alkoxy" can be referred to aforementioned "aryl", in which the preferred one may be phenyl.

10        Suitable example of "higher alkoxy" in the term of "lower alkanoyl substituted with oxazolyl which has aryl having higher alkoxy" can be referred to aforementioned "higher alkoxy", in which the preferred one may be (C<sub>7</sub>-C<sub>14</sub>)alkoxy, and the most preferred one may be octyloxy.

15        Suitable example of "lower alkanoyl" in the term of "lower alkanoyl substituted with furyl which has aryl substituted with aryl having lower alkoxy" can be referred to aforementioned "lower alkanoyl", in which the preferred one may be (C<sub>1</sub>-C<sub>4</sub>)alkanoyl, and the most preferred one may be formyl.

20        Suitable example of "aryl" in the term of "lower alkanoyl substituted with furyl which has aryl substituted with aryl having lower alkoxy" can be referred to aforementioned "aryl", in which the preferred one may be phenyl.

25        Suitable example of "lower alkoxy" in the term of "lower alkanoyl substituted with furyl which has aryl substituted with aryl having lower alkoxy" can be referred to aforementioned "lower alkoxy", in which the preferred one may be (C<sub>1</sub>-C<sub>4</sub>)alkoxy, and the most preferred one may be butoxy.

30        Suitable example of "lower alkanoyl" in the term of "lower alkanoyl substituted with triazolyl which has oxo and aryl having higher alkyl" can be referred to

aforementioned "lower alkanoyl", in which the preferred one may be (C<sub>1</sub>-C<sub>4</sub>)alkanoyl, and the most preferred one may be formyl.

5        Suitable example of "higher alkyl" in the term of "lower alkanoyl substituted with triazolyl which has oxo and aryl having higher alkyl" can be referred to aforementioned "higher alkyl", in which the preferred one may be (C<sub>7</sub>-C<sub>14</sub>)alkyl, and the most preferred one may be octyl.

10       Suitable example of "aryl" in the term of "lower alkanoyl substituted with triazolyl which has oxo and aryl having higher alkyl" can be referred to aforementioned "aryl", in which the preferred one may be phenyl.

15       Suitable example of "higher alkanoyl" in the term of "higher alkanoyl having hydroxy" can be referred to aforementioned "higher alkanoyl", in which the preferred one may be (C<sub>7</sub>-C<sub>20</sub>)alkanoyl, and the most preferred one may be hexadecanoyl.

20       Suitable example of "higher alkanoyl" in the term of "higher alkanoyl having ar(lower)alkyl and hydroxy" can be referred to aforementioned "higher alkanoyl", in which the preferred one may be (C<sub>7</sub>-C<sub>20</sub>)alkanoyl, and the most preferred one may be hexadecanoyl.

25       Suitable example of "ar(lower)alkyl" in the term of "higher alkanoyl having ar(lower)alkyl and hydroxy" can be referred to aforementioned "ar(lower)alkyl", in which the preferred one may be phenyl(C<sub>1</sub>-C<sub>4</sub>)alkyl, and the most preferred one may be benzyl.

30       Suitable example of "(C<sub>2</sub>-C<sub>6</sub>)alkanoyl" in the terms of "(C<sub>2</sub>-C<sub>6</sub>)alkanoyl substituted with aryl having higher alkoxy, in which (C<sub>2</sub>-C<sub>6</sub>)alkanoyl may have amino or protected amino" may include acetyl, propanoyl, butanoyl,

pentanoyl, hexanoyl, and the like, in which the preferred one may be acetyl and propanoyl.

Suitable example of "aryl" in the term of "(C<sub>2</sub>-C<sub>6</sub>)alkanoyl substituted with aryl having higher alkoxy, in which (C<sub>2</sub>-C<sub>6</sub>)alkanoyl may have amino or protected amino" can be referred to aforementioned "aryl", in which the preferred one may be phenyl.

Suitable example of "higher alkoxy" in the term of "(C<sub>2</sub>-C<sub>6</sub>)alkanoyl substituted with aryl having higher alkoxy, in which (C<sub>2</sub>-C<sub>6</sub>)alkanoyl may have amino or protected amino" can be referred to aforementioned "higher alkoxy", in which the preferred one may be (C<sub>7</sub>-C<sub>14</sub>)alkoxy, and the most preferred one may be octyloxy.

Suitable example of "protected amino" in the term of "(C<sub>2</sub>-C<sub>6</sub>)alkanoyl substituted with aryl having higher alkoxy, in which (C<sub>2</sub>-C<sub>6</sub>)alkanoyl may have amino or protected amino" can be referred to aforementioned "protected amino", in which the preferred one may be ar(lower)alkoxycarbonylamino, and the most preferred one may be benzyloxycarbonylamino.

The process for preparing the object polypeptide compound [I] or a salt thereof of the present invention are explained in detail in the following.

25

CL

#### Process 1

The object polypeptide compound [I] or a salt thereof can be prepared by reacting the compound [II] or its reactive derivative at the amino group or a salt thereof with the compound [III] or its reactive derivative at the carboxy group or a salt thereof.

Suitable reactive derivative at the carboxy group of the compound [III] may include an acid halide, an acid anhydride, an activated amide, an activated ester, and the like. Suitable examples of the reactive derivatives may

be an acid chloride; an acid azide; a mixed acid anhydride with an acid such as substituted phosphoric acid [e.g., dialkylphosphoric acid, phenylphosphoric acid, diphenylphosphoric acid, dibenzylphosphoric acid, halogenated phosphoric acid, etc.], dialkylphosphorous acid, sulfurous acid, thiosulfuric acid, sulfuric acid, sulfonic acid [e.g., methanesulfonic acid, etc.], aliphatic carboxylic acid [e.g., acetic acid, propionic acid, butyric acid, isobutyric acid, pivalic acid, pentanoic acid, isopentanoic acid, 2-ethylbutyric acid, trichloroacetic acid, etc.]; or aromatic carboxylic acid [e.g., benzoic acid, etc.]; a symmetrical acid anhydride; an activated amide with imidazole, 4-substituted imidazole, dimethylpyrazole, triazole, tetrazole or 1-hydroxy-1H-benzotriazole; or an activated ester [e.g., cyanomethyl ester, methoxymethyl ester, dimethyliminomethyl  $[(CH_3)_2N^+=CH-]$  ester, vinyl ester, propargyl ester, p-nitrophenyl ester, 2,4-dinitrophenyl ester, trichlorophenyl ester, pentachlorophenyl ester, mesylphenyl ester, phenylazophenyl ester, phenyl thioester, p-nitrophenyl thioester, p-cresyl thioester, carboxymethyl thioester, pyranyl ester, pyridyl ester, piperidyl ester, 8-quinolyl thioester, etc.], or an ester with a N-hydroxy compound [e.g. N,N-dimethylhydroxylamine, 1-hydroxy-2-(1H)-pyridone, N-hydroxysuccinimide, N-hydroxyphthalimide, 1-hydroxy-1H-benzotriazole, etc.], and the like. These reactive derivatives can optionally be selected from them according to the mind of the compound [III] to be used.

Suitable salts of the compound [III] and its reactive derivative can be referred to the ones as exemplified for the object polypeptide compound [I].

The reaction is usually carried out in a conventional solvent such as water, alcohol [e.g., methanol, ethanol,

etc.], acetone, dioxane, acetonitrile, chloroform, methylene chloride, ethylene chloride, tetrahydrofuran, ethyl acetate, N,N-dimethylformamide, pyridine or any other organic solvent which does not adversely influence the reaction. These conventional solvent may also be used in a mixture with water.

In this reaction, when the compound [III] is used in a free acid form or its salt form, the reaction is preferably carried out in the presence of a conventional condensing agent such as N,N'-dicyclohexylcarbodiimide; N-cyclohexyl-N'-morpholinoethylcarbodiimide; N-cyclohexyl-N'-(4-diethylaminocyclohexyl)carbodiimide; N,N'-diethylcarbodiimide, N,N'-diisopropylcarbodiimide; N-ethyl-N'-(3-dimethylaminopropyl)carbodiimide, N,N-carbonylbis-(2-methylimidazole); pentamethyleneketene-N-cyclohexylimine; diphenylketene-N-cyclohexylimine; ethoxyacetylene; 1-alkoxy-2-chloroethylene; trialkyl phosphite; ethyl polyphosphate; isopropyl polyphosphate; phosphorus oxychloride (phosphoryl chloride); phosphorus trichloride; thionyl chloride; oxalyl chloride; lower alkyl haloformate [e.g., ethyl chloroformate, isopropyl chloroformate, etc.]; triphenylphosphine; 2-ethyl-7-hydroxybenzisoxazolium salt; 2-ethyl-5-(m-sulfophenyl)isoxazolium hydroxide intramolecular salt; i-(p-chlorobenzenesulfonyloxy)-6-chloro-1H-benzotriazole; so-called Vilsmeier reagent prepared by the reaction of N,N-dimethylformamide with thionyl chloride, phosgene, trichloromethyl chloroformate, phosphorous oxychloride, methanesulfonyl chloride, etc.; or the like.

The reaction may also be carried out in the presence of an inorganic or organic base such as an alkali metal carbonate, alkali metal bicarbonate, tri(lower)alkylamine, pyridine, di(lower)alkylaminopyridine (e.g.,

4-dimethylaminopyridine, etc.), N-(lower)alkylmorpholine, N,N-di(lower)alkylbenzylamine, or the like.

The reaction temperature is not critical, and the reaction is usually carried out under cooling to warming.

5

The starting compound [II] is a known compound. It can be prepared by fermentation and synthetic processes disclosed in EP 0462531 A2.

10 A culture of Coleophoma sp. F-11899, which is used in said fermentation process, has been deposited with National Institute of Bioscience and Human-Technology Agency of Industrial Science and Technology (former name: Fermentation Research Institute Agency of Industrial Science and Technology) (1-3, Higashi 1-chome, Tsukuba-  
15 shi, IBARAKI 305, JAPAN) on October 26, 1989 under the number of FERM BP-2635.

20 The compounds obtained by the above Process 1 can be isolated and purified by a conventional method such as pulverization, recrystallization, column-chromatography, high-performance liquid chromatography (HPLC), reprecipitation, or the like.

25 The compounds obtained by the above Process 1 may be obtained as its hydrate, and its hydrate is included within the scope of this invention.

30 It is to be noted that each of the object compound (I) may include one or more stereoisomer such as optical isomer(s) and geometrical isomer(s) due to asymmetric carbon atom(s) and double bond(s) and all such isomers and mixture thereof are included within the scope of this invention.

35

CLV/L Biological property of the polypeptide  
compound [I] of the present invention

In order to show the usefulness of the polypeptide  
5 compound [I] of the present invention, the biological data  
of the representative compound is explained in the  
following.

CLV/L  
Test 1 (Antimicrobial activity) :

10 In vitro antimicrobial activity of the compound of  
Example 17 disclosed later was determined by the two-fold  
agar-plate dilution method as described below.

CLV/L  
Test Method

15 One loopful of an overnight culture of each test  
microorganism in Sabouraud broth containing 2% Glucose  
( $10^5$  viable cells per ml) was streaked on yeast nitrogen  
base dextrose agar (YNBDA) containing graded  
concentrations of the object polypeptide compound [I], and  
20 the minimal inhibitory concentration (MIC) was expressed  
in terms of  $\mu\text{g/ml}$  after incubation at  $30^\circ\text{C}$  for 24 hours.

CLV/L  
Test Result

MIC ( $\mu\text{g/ml}$ )

25

Test compound Test organism	The compound of Example 17
candida albicans FP-633	0.2

30

P From the test result, it is realized that the object  
polypeptide compound [I] of the present invention has an  
antimicrobial activity (especially, antifungal activity).

35

The pharmaceutical composition of the present

invention can be used in the form of a pharmaceutical preparation, for example, in solid, semisolid or liquid form, which contains the object polypeptide compound (I) or a pharmaceutically acceptable salt thereof, as an  
5 active ingredient in admixture with an organic or inorganic carrier or excipient which is suitable for rectal; pulmonary (nasal or buccal inhalation); ocular; external (topical); oral administration; parenteral (including subcutaneous, intravenous and intramuscular)  
10 administrations; insufflation (including aerosols from metered dose inhalator); nebulizer; or dry powder inhalator.

The active ingredient may be compounded, for example,  
15 with the usual non-toxic, pharmaceutically acceptable carriers in a solid form such as granules, tablets, dragees, pellets, troches, capsules, or suppositories; creams, ointments; aerosols; powders for insufflation; in a liquid form such as solutions, emulsions, or  
20 suspensions for injection; ingestion; eye drops; and any other form suitable for use. And, if necessary, there may be included in the above preparation auxiliary substance such as stabilizing, thickening, wetting, emulsifying and coloring agents; perfumes or buffer; or any other commonly  
25 may be used as additives.

The object polypeptide compound [I] or a pharmaceutically acceptable salt thereof is/are included in the pharmaceutical composition in an amount sufficient to produce the desired antimicrobial effect upon the  
30 process or condition of diseases.

For applying the composition to human, it is preferable to apply it by intravenous, intramuscular, pulmonary, oral administration, or insufflation. While the dosage of therapeutically effective amount of the  
35 object polypeptide compound [I] varies from and also



depends upon the age and condition of each individual patient to be treated, in the case of intravenous administration, a daily dose of 0.01-20 mg of the object polypeptide compound [I] per kg weight of human being in the case of intramuscular administration, a daily dose of 0.1-20 mg of the object polypeptide compound [I] per kg weight of human being, in case of oral administration, a daily dose of 0.5-50 mg of the object polypeptide compound [I] per kg weight of human being is generally given for treating or preventing infectious diseases.

Especially in case of the treatment or prevention of Pneumocystis carinii infection, the followings are to be noted.

For administration by inhalation, the compounds of the present invention are conveniently delivered in the form of an aerosol spray presentation from pressurized containers or powders which may be formulated and the powder compositions may be inhaled with the aid of an insufflation powder inhaler device. The preferred delivery system for inhalation is a metered dose inhalation aerosol, which may be formulated as a suspension or solution of compound in suitable propellants such as fluorocarbons or hydrocarbons.

Because of desirability to directly treat lung and bronchi, aerosol administration is a preferred method of administration. Insufflation is also a desirable method, especially where infection may have spread to ears and other body cavities.

Alternatively, parenteral administration may be employed using drip intravenous administration.

The following Preparations and Examples are given for the purpose of illustrating the present invention in more detail.

CL Preparation 1

To a suspension of 1-(4-Hydroxyphenyl)-4-tert-butoxycarbonylpiperazine (3 g) and potassium carbonate (0.82 g) in N,N-dimethylformamide (15 ml) was added octyl bromide (1.87 ml). The mixture was stirred for 10 hours at 70°C. The reaction mixture was added to a mixture of water and ethyl acetate. The organic layer was taken, and dried over magnesium sulfate. The magnesium sulfate was filtered off, and the filtrate was evaporated under reduced pressure. The residue was subjected to column chromatography on silica gel, and eluted with (hexane : ethyl acetate = 9:1). The fractions containing the object compound were combined, and evaporated under reduced pressure to give 1-(4-n-Octyloxyphenyl)-4-tert-butoxycarbonylpiperazine (2.71 g).

IR (KBr) : 1687, 1513, 1241  $\text{cm}^{-1}$

$^1\text{H}$  NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 0.88 (3H, t,  $J=6.2\text{Hz}$ ), 1.2-1.4 (10H, m), 1.48 (9H, s), 1.65-1.85 (2H, m), 3.00 (4H, t,  $J=5.2\text{Hz}$ ), 3.57 (4H, t,  $J=5.2\text{Hz}$ ), 3.90 (2H, t,  $J=6.5\text{Hz}$ ), 6.83 (2H, dd,  $J=6.4$  and 2.1Hz), 6.89 (2H, dd,  $J=6.4$  and 2.1Hz)

CL Preparation 2

A solution of 1-(4-n-Octyloxyphenyl)-4-tert-butoxycarbonylpiperazine (2.61 g) in trifluoroacetic acid (20 ml) was stirred for 4 hours at ambient temperature. The reaction mixture was evaporated under reduced pressure, and to the residue was added a mixture of 1N NaOH aqueous solution and ethyl acetate. The organic layer was taken, and dried over magnesium sulfate. The magnesium sulfate was filtered off, and the filtrate was evaporated under reduced pressure to give 1-(4-n-Octyloxyphenyl)piperazine (0.86 g).

$^1\text{H}$  IR (KBr) : 2923, 1513, 1259, 831  $\text{cm}^{-1}$

$^1\text{H}$  NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 0.88 (3H, t,  $J=6.4\text{Hz}$ ), 1.2-1.53

(10H, m), 1.65-1.85 (2H, m), 3.03 (4H, s), 3.90  
(2H, t, J=6.5Hz), 6.83 (2H, dd, J=6.4 and  
2.9Hz), 6.90 (2H, dd, J=6.4 and 2.9Hz)

P APCI-MASS : m/z = 291 (M<sup>+</sup>+1)

5

CV Preparation 3

To a suspension of 1-(4-n-Octyloxyphenyl)piperazine  
(1 g) and potassium carbonate (0.476 g) in N,N-dimethyl-  
formamide (1 ml) was added p-fluorobenzonitrile (0.347 g),  
10 and stirred for 5 hours at 160°C. The reaction mixture  
was added to a mixture of water and ethyl acetate. The  
organic layer was taken, and dried over magnesium sulfate.  
The magnesium sulfate was filtered off, and the filtrate  
was evaporated under reduced pressure to give 4-[4-(4-n-  
15 Octyloxyphenyl)piperazin-1-yl]benzonitrile (0.93 g).

P IR (KBr) : 2848, 2217, 1604, 1511, 1241 cm<sup>-1</sup>

P NMR (CDCl<sub>3</sub>, δ) : 0.89 (3H, t, J=6.8Hz), 1.2-1.53  
(10H, m), 1.65-1.85 (2H, m), 3.20 (4H, t,  
J=5.4Hz), 3.48 (4H, t, J=5.4Hz), 3.91 (2H, t,  
20 J=6.5Hz), 6.8-7.0 (6H, m), 7.52 (2H, d, J=8.9Hz)

P APCI-MASS : m/z = 392 (M<sup>+</sup>+1)

CV Preparation 4

A mixture of 2,4-Dihydroxybenzaldehyde (5.52 g),  
25 potassium carbonate (6.08 g) and octyl bromide (7.73 g) in  
acetonitrile (55 ml) was stirred for 16 hours at 60°C.  
The solvent of reaction mixture was removed under reduced  
pressure, and the residue was dissolved in ethyl acetate,  
and washed with water and brine. The separated organic  
30 layer was dried over magnesium sulfate. The magnesium  
sulfate was filtered off, and the filtrate was evaporated  
under reduced pressure. The residue was subjected to  
column chromatography on silica gel and eluted with  
(hexane : ethyl acetate = 9:1) to give 2-Hydroxy-4-  
35 octyloxybenzaldehyde (6.73 g).

- 1 NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 0.89 (3H, t,  $J=8.8\text{Hz}$ ), 1.2-1.5  
(10H, m), 1.8-2.0 (2H, m), 4.0-4.2 (2H, m), 6.42  
(1H, s), 6.52 (1H, d,  $J=8.7\text{Hz}$ ), 7.79 (1H, d,  
 $J=8.7\text{Hz}$ ), 10.33 (1H, s)
- 5 1 APCI-MASS :  $m/z = 257 (M^+ + 1)$

The following compound was obtained according to a similar manner to that of Preparation 4.

10 Preparation 5

CL Methyl 3,4-dipentyloxybenzoate

- P NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 0.93 (6H, t,  $J=6.0$  and  $9.0\text{Hz}$ ), 1.3-  
2.0 (12H, m), 3.88 (3H, s), 4.04 (4H, m),  
6.86 (1H, d,  $J=8.4\text{Hz}$ ), 7.53 (1H, d,  $J=2.0\text{Hz}$ ),  
15 7.63 (1H, dd,  $J=8.4$  and  $2.0\text{Hz}$ )
- P APCI-MASS :  $m/z = 309 (M^+ + 1)$

CL Preparation 6

- A mixture of 4-bromo-4'-pentylbiphenyl (5.04 g),  
20 trimethylsilylacetylene (2.4 ml),  
tetrakis(triphenylphosphine)palladium (0.96 g),  
triphenylphosphine (0.22 g) and cuprous iodide (95 mg) in  
piperidine (10 ml) was heated for an hour under  
atmospheric pressure of nitrogen at  $90^\circ\text{C}$ . The reaction  
25 mixture was poured into a mixture of cold water and ethyl  
acetate, and adjusted to about pH 1 with 6N hydrochloric  
acid. The separated organic layer was washed with water  
and brine, and dried over magnesium sulfate. The  
magnesium sulfate was filtered off, and the filtrate was  
30 evaporated under reduced pressure to give crude 2-[4-(4-  
pentyphenyl)phenyl]-1-trimethylsilylacetylene, which was  
used for the next reaction without further purification.  
Crude mixture was dissolved in a mixture of  
dichloromethane (10 ml) and methanol (10 ml), and to the  
35 solution was added potassium carbonate (2.75 g) at  $0^\circ\text{C}$ .

The mixture was allowed to warm to ambient temperature, and stirred for another 2 hours. The reaction mixture was poured into a mixture of cold water and ethyl acetate, and the resultant precipitate was filtered off. The filtrate was adjusted to about pH 7 with 1N hydrochloric acid, and washed with brine, and dried over magnesium sulfate. The magnesium sulfate was filtered off, and the filtrate was evaporated under reduced pressure to give a crude powder, which was subjected to column chromatography on silica gel (300 ml), and eluted with a mixture of (n-hexane : ethyl acetate = 99:1 - 97:3, V/V) to give 4-(4-Pentylphenyl)phenylacetylene (2.09g).

IR (Nujol) : 3274, 1490  $\text{cm}^{-1}$

<sup>1</sup>H NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 0.90 (3H, t,  $J=6.4\text{Hz}$ ), 1.30-1.50 (4H, m), 1.50-1.80 (2H, m), 2.64 (2H, t,  $J=7.6\text{Hz}$ ), 7.20-7.30 (2H, m), 7.45-7.60 (6H, m)

APCI-MASS :  $m/z = 281$  ( $M^++1$  + MeOH)

The following compound was obtained according to a similar manner to that of Preparation 6.

#### Preparation 7

##### 6-Heptyloxynaphthalen-2-yl-acetylene

<sup>1</sup>H NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 0.90 (3H, t,  $J=6.5\text{Hz}$ ), 1.20-1.60 (8H, m), 1.70-1.90 (2H, m), 3.10 (1H, s), 4.07 (2H, t,  $J=6.5\text{Hz}$ ), 7.08 (1H, d,  $J=2.5\text{Hz}$ ), 7.15 (1H, dd,  $J=2.5$  and  $8.9\text{Hz}$ ), 7.47 (1H, dd,  $J=1.6$  and  $8.5\text{Hz}$ ), 7.64 (1H, d,  $J=7.3\text{Hz}$ ), 7.68 (1H, d,  $J=8.5\text{Hz}$ ), 7.94 (1H, d,  $J=1.6\text{Hz}$ )

APCI-MASS :  $m/z = 267$  ( $M^++1$ )

#### Preparation 8

To a solution of 4-(4-Pentylphenyl)phenylacetylene (2.09 g) in tetrahydrofuran (30 ml) was added dropwise a solution of lithium diisobutylamide in a mixture of

tetrahydrofuran and n-hexane (1.60 M, 5.6 ml) at -75°C, and the resultant mixture was stirred for an hour at -78°C. To the mixture was added methyl chloroformate (0.72 ml), and the reaction mixture was allowed to warm to ambient temperature. The solution was diluted with ethyl acetate, and washed in turn with water and brine, and dried over magnesium sulfate. The magnesium sulfate was filtered off, and the filtrate was evaporated under reduced pressure to give a crude product, which was subjected to column chromatography on silica gel (150 ml), and eluted with a mixture of (n-hexane : ethyl acetate = 100:0 - 9:1, V/V) to give Methyl 3-[4-(4-pentylphenyl)phenyl]propionate (2.20 g).

IR (Nujol) : 2225, 1712  $\text{cm}^{-1}$

$^1\text{H}$  NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 0.90 (3H, t,  $J=6.5\text{Hz}$ ), 1.25-1.50 (4H, m), 1.52-1.80 (2H, m), 2.64 (2H, t,  $J=7.6\text{Hz}$ ), 3.85 (3H, s), 7.20-7.35 (2H, m), 7.40-7.70 (6H, m)

APCI-MASS :  $m/z = 307$  ( $M^++1$ )

The following compound was obtained according to a similar manner to that of Preparation 8.

#### Preparation 9

Methyl 3-(6-heptyloxynaphthalen-2-yl)propionate

IR (Nujol) : 2219, 1704, 1621  $\text{cm}^{-1}$

$^1\text{H}$  NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 0.90 (3H, t,  $J=6.5\text{Hz}$ ), 1.20-1.60 (8H, m), 1.70-2.00 (2H, m), 3.86 (3H, s), 4.08 (2H, t,  $J=6.5\text{Hz}$ ), 7.10 (1H, d,  $J=2.5\text{Hz}$ ), 7.17 (1H, dd,  $J=2.5$  and  $8.9\text{Hz}$ ), 7.52 (1H, dd,  $J=1.6$  and  $8.5\text{Hz}$ ), 7.68 (1H, d,  $J=7.3\text{Hz}$ ), 7.72 (1H, d,  $J=8.5\text{Hz}$ ), 8.06 (1H, d,  $J=1.6\text{Hz}$ )

APCI-MASS :  $m/z = 325$  ( $M^++1$ )

#### Preparation 10

A mixture of 4-bromo-4'-pentylbiphenyl (5.0 g), methyl acrylate (2.2 ml), palladium acetate (0.11 g) and tris(o-tolyl)phosphine (0.60 g) in triethylamine (16 ml) was refluxed for 15 hours under nitrogen atmosphere. The reaction mixture was poured into a mixture of cold water and ethyl acetate, and adjusted to about pH 1.5 with 6N hydrochloric acid. The separated organic layer was washed in turn with water and brine, and dried over magnesium sulfate. The magnesium sulfate was filtered off, and the filtrate was evaporated under reduced pressure to give a crude powder, which was subjected to column chromatography on silica gel (200 ml), and eluted with a mixture of (n-hexane : ethyl acetate = 100:0 - 94:6, V/V) to give Methyl 3-[4-(4-pentylphenyl)phenyl]acrylate (4.48 g).

IR (Nujol) : 1718, 1637  $\text{cm}^{-1}$

$^1\text{H}$  NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 0.91 (3H, t,  $J=6.7\text{Hz}$ ), 1.20-1.50 (4H, m), 1.50-1.80 (2H, m), 2.65 (2H, t,  $J=7.4\text{Hz}$ ), 3.82 (3H, s), 6.47 (1H, d,  $J=16.0\text{Hz}$ ), 7.20-7.35 (2H, m), 7.45-7.68 (6H, m), 7.73 (1H, d,  $J=16.0\text{Hz}$ )

APCI-MASS :  $m/z = 309 (M^++1)$

The following compounds (Preparations 11 to 13) were obtained according to a similar manner to that of Preparation 10.

Preparation 11

Methyl 3-(6-heptyloxynaphthalen-2-yl)acrylate

IR (Nujol) : 1716, 1625, 1459  $\text{cm}^{-1}$

$^1\text{H}$  NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 0.90 (3H, t,  $J=6.5\text{Hz}$ ), 1.20-1.65 (8H, m), 1.76-1.93 (2H, m), 3.82 (3H, s), 4.07 (2H, t,  $J=6.5\text{Hz}$ ), 6.49 (1H, d,  $J=16.0\text{Hz}$ ), 7.05-7.20 (2H, m), 7.55-7.90 (5H, m)

APCI-MS :  $m/z = 327 (M^++1)$

CL Preparation 12

CL Methyl 3-[4-(4-heptylphenyl)phenyl]acrylate

5 P NMR (CDCl<sub>3</sub>,  $\delta$ ) : 0.88 (3H, t, J=6.5Hz), 1.15-1.50 (8H, m), 1.50-1.75 (2H, m), 2.64 (2H, t, J=7.6Hz), 3.81 (3H, s), 6.46 (1H, d, J=16.0Hz), 7.26 (2H, d, J=8.2Hz), 7.52 (2H, d, J=8.2Hz), 7.59 (6H, s), 7.73 (1H, d, J=16.0Hz)

P APCI-MASS : m/z = 337 (M<sup>+</sup>+1)

10 CL Preparation 13

CL Methyl 3-[4-(4-pentyloxyphenyl)phenyl]acrylate

15 P NMR (CDCl<sub>3</sub>,  $\delta$ ) : 0.94 (3H, t, J=7.0Hz), 1.30-1.60 (4H, m), 1.70-1.93 (2H, m), 3.82 (3H, s), 4.00 (2H, t, J=6.7Hz), 6.45 (1H, d, J=16.0Hz), 6.90-7.05 (2H, m), 7.48-8.65 (6H, m), 7.72 (1H, d, J=16.0Hz)

P APCI-MASS : m/z = 325 (M<sup>+</sup>+1)

CL Preparation 14

20 A mixture of 6-Heptyloxynaphthalen-2-carboxylic acid (1.00 g) and thionyl chloride (5 ml) was stirred for 18 hours at ambient temperature, and concentrated under reduced pressure to give crude 6-heptyloxy-2-naphthoyl chloride. To a mixture of ethyl isonipecotinate (605 mg),  
25 triethylamine (425 mg) and N,N-dimethylaminopyridine (10 mg) in dichloromethane (10 ml) was added crude 6-heptyloxy-2-naphthoyl chloride, and the mixture was stirred for 2 hours at ambient temperature, and diluted with dichloromethane. The mixture was washed with water,  
30 1N hydrochloric acid and brine, and dried over magnesium sulfate. The magnesium sulfate was filtered off, and filtrate was evaporated under reduced pressure. The residue was subjected to column chromatography on silica gel, and eluted with (n-hexane : ethyl acetate = 3:1) to  
35 give 4-Ethoxycarbonyl-1-(6-heptyloxy-2-



naphthoyl)piperidine (1.20 g).

1  
5  
P NMR (CDCl<sub>3</sub>,  $\delta$ ) : 0.90 (3H, t, J=6.6Hz), 1.2-2.0  
(19H, m), 2.5-2.7 (1H, m), 3.0-3.2 (2H, m), 4.1-  
4.3 (4H, m), 7.1-7.2 (2H, m), 7.44 (1H, dd,  
J=8.4 and 1.7Hz), 7.72 (1H, d, J=3.9Hz), 7.77  
(1H, d, J=3.9Hz), 7.82 (1H, s)

P APCI-MASS : m/z = 426 (M<sup>+</sup>+1)

C<sup>✓</sup> Preparation 15

10 To a mixture of Methyl 3,4-diaminobenzoate (1.91 g)  
and triethylamine (0.56 g) in N,N-dimethylformamide (20  
ml) was added decanoyl chloride (2.31 g), and the mixture  
was stirred for an hour at 0°C. The reaction mixture was  
15 diluted with ethyl acetate, and washed with water and  
brine. The separated organic layer was dried over  
magnesium sulfate. The magnesium sulfate was filtered  
off, and filtrate was evaporated under reduced pressure.  
The residue was dissolved in methanol (20 ml), and conc.  
20 sulfuric acid (0.05 ml) was added, and the mixture was  
stirred for 6 hours at 60°C. After cooling, the reaction  
mixture was evaporated under reduced pressure. The  
residue was diluted with ethyl acetate, and washed with  
water and brine. The separated organic layer was dried  
over magnesium sulfate. The magnesium sulfate was  
25 filtered off, and filtrate was evaporated under reduced  
pressure. Purification of the residue by column  
chromatography on silica gel eluted with (n-hexane : ethyl  
acetate = 3:1) gave

5-Methoxycarbonyl-2-nonylbenzimidazole (1.40 g).

30 P IR (KBr pelet) : 2923, 1718, 1623, 1544, 1438, 1413,  
1288, 1213, 1085, 750 cm<sup>-1</sup>

P NMR (DMSO-d<sub>6</sub>,  $\delta$ ) : 0.84 (3H, t, J=6.7Hz), 1.1-1.4  
(12H, m), 1.7-1.9 (2H, m), 2.83 (2H, t,  
J=7.4Hz), 7.56 (1H, d, J=8.4Hz), 7.78 (1H, d,  
35 J=8.4Hz), 8.07 (1H, s)

⌘ APCI-MASS :  $m/z = 303 (M^++1)$

✓ Preparation 16

To a mixture of dimethylmalonate (4 ml), 2-hydroxy-4-octyloxybenzaldehyde (2.50 g) and piperidine (0.1 ml) in methanol (10 ml) was added acetic acid (0.01 ml), and the mixture was stirred for 3 hours at 70°C. The solvents were removed under reduced pressure, and the residue was dissolved in ethyl acetate, and washed with 0.5N hydrochloric acid, water and brine, and dried over magnesium sulfate. The magnesium sulfate was filtered off, and filtrate was evaporated under reduced pressure, and the precipitate was collected by filtration, and washed with n-hexane, and dried to give Methyl 7-octyloxy coumarin-3-carboxylate (0.94 g).

⌘ NMR (DMSO- $d_6$ ,  $\delta$ ) : 0.86 (3H, m), 1.2-1.6 (10H, m), 1.7-1.8 (2H, m), 3.81 (3H, s), 4.11 (2H, t,  $J=6.4\text{Hz}$ ), 6.9-7.1 (2H, m), 7.83 (1H, d,  $J=9.0\text{Hz}$ ), 8.75 (1H, s)

⌘ APCI-MASS :  $m/z = 333 (M^++1)$

✓ Preparation 17

To a mixture of sodium hydride (423 mg) and 4-octylphenol (2.06 g) in tetrahydrofuran (16 ml) was added dropwise ethyl 2-chloroacetoacetate at ambient temperature. The mixture was stirred for 6 hours at 70°C under nitrogen atmosphere, and poured into saturated ammonium chloride aqueous solution. The solution was extracted with ethyl acetate, and the organic layer was washed with water and brine, and dried over magnesium sulfate. The magnesium sulfate was filtered off, and the filtrate was evaporated under reduced pressure. The residue was added to conc.  $\text{H}_2\text{SO}_4$  (10 ml) at 0°C, and mixture was stirred for 10 minutes. The reaction mixture was poured into ice-water, and adjusted to pH 7.0 with 1N

NaOH aqueous solution, and extracted with ethyl acetate. The organic layer was washed with water and brine, and dried over magnesium sulfate. The magnesium sulfate was filtered off, and the filtrate was evaporated under reduced pressure. The residue was subjected to column-chromatography on silica gel, and eluted with (hexane : ethyl acetate = 95:5). The fractions containing the object compound were combined, and evaporated under reduced pressure to give Ethyl 3-methyl 5-octylbenzo[b]furan-2-carboxylate (1.44 g).

IR (Neat) : 2925, 2854, 1712, 1596, 1463, 1292, 1149, 1089  $\text{cm}^{-1}$

<sup>1</sup>H NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 0.88 (3H, t,  $J=6.7\text{Hz}$ ), 1.2-1.5 (10H, m), 1.44 (3H, t,  $J=7.1\text{Hz}$ ), 1.6-1.8 (2H, m), 2.58 (3H, s), 2.71 (2H, t,  $J=8.0\text{Hz}$ ), 4.45 (2H, t,  $J=7.1\text{Hz}$ ), 7.2-7.5 (3H, m)

APCI-MASS :  $m/z$  = 317 ( $M^++1$ )

#### Preparation 18

To a solution of Ethyl 3-amino-4-hydroxybenzoate (1.81 g) and triethylamine (1.53 ml) in dichloromethane (20 ml) was dropwise added decanoyl chloride (2.01 ml) at 0°C. The reaction mixture was stirred for 48 hours at ambient temperature, and washed with water, 0.5N hydrochloric acid, water and brine. The separated organic layer was dried over magnesium sulfate. The magnesium sulfate was filtered off, and the filtrate was evaporated under reduced pressure. To the residue dissolved in xylene (30 ml) was added p-toluene sulfonic acid monohydrate (0.5 g), and the mixture was stirred for 4 hours at 130°C. Ethyl acetate was added to the mixture, and washed with water and brine. The separated organic layer was dried over magnesium sulfate. The magnesium sulfate was filtered off, and the filtrate was evaporated under reduced pressure. Purification of the residue by

column chromatography on silica gel elluted with  
(n-hexane : ethyl acetate = 9:1, V/V) gave Ethyl 2-nonyl  
benzo[b]oxazole-6-carboxylate (2.36 g).

5 IR (KBr pelet) : 2914, 1722, 1621, 1575, 1470,  
1429, 1365, 1290, 1203, 1151, 1115, 1081,  
1022  $\text{cm}^{-1}$

10 NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 0.88 (3H, t,  $J=6.7\text{Hz}$ ), 1.2-1.4 (12H,  
m), 1.42 (3H, t,  $J=7.2\text{Hz}$ ), 1.90 (2H, m), 2.95  
(2H, t,  $J=7.4\text{Hz}$ ), 4.40 (2H, q,  $J=7.0\text{Hz}$ ), 7.50  
(1H, d,  $J=8.5\text{Hz}$ ), 8.06 (1H, d,  $J=8.5\text{Hz}$ ), 8.37  
(1H, s)

APCI-MASS :  $m/z = 318$  ( $M^++1$ )

✓ Preparation 19

15 A mixture of Methyl 3,4-diaminobenzoate (1.84 g) and  
4-hexyloxy benzaldehyde (2.30 g) in nitrobenzene (40 ml)  
was stirred for 48 hours at  $145^\circ\text{C}$ . After cooling, the  
mixture was evaporated under reduced pressure.  
Purification of the residue by column chromatography on  
20 silica gel eluted with (n-hexane : ethyl acetate = 2:1)  
gave 5-Methoxycarbonyl-2-(4-hexyloxyphenyl)benzimidazole  
(1.19 g).

25 NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 0.90 (3H, t,  $J=6.4\text{Hz}$ ), 1.2-1.9 (8H,  
m), 3.92 (3H, s), 3.90-4.1 (2H, m), 6.93 (2H, d,  
 $J=8.9\text{Hz}$ ), 7.5-7.8 (1H, br), 7.94 (1H, dd,  $J=8.5$   
and  $1.5\text{Hz}$ ), 8.03 (1H, d,  $J=8.9\text{Hz}$ ), 8.2-8.4 (1H,  
br)

APCI-MASS :  $m/z = 353$  ( $M^++1$ )

30 ✓ Preparation 20

A mixture of Methyl 3-[4-(4-pentylphenyl)phenyl]-  
acrylate (2.0 g) and 10% palladium on carbon (50% wet, 0.2  
g) in tetrahydrofuran (20 ml) was stirred for 8 hours  
under atmospheric pressure of hydrogen at ambient  
35 temperature. The catalyst was filtered off, and the

filtrate was evaporated under reduced pressure to give Methyl 3-[4-(4-pentylphenyl)phenyl]propionate (1.93 g).

1  $\delta$  NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 0.90 (3H, t,  $J=6.8\text{Hz}$ ), 1.25-1.50 (4H, m), 1.50-1.75 (2H, m), 2.55-2.75 (4H, m), 2.99 (2H, t,  $J=8.0\text{Hz}$ ), 3.68 (3H, s), 7.10-7.30 (4H, m), 7.40-7.60 (4H, m)

1  $\delta$  APCI-MASS :  $m/z = 311$  ( $M^++1$ )

Preparation 21

10 A mixture of Methyl 3-[4-(4-pentyloxyphenyl)phenyl]-acrylate (2.70 g) and platinum oxide (0.41 g) in tetrahydrofuran (40 ml) was stirred for 8 hours under 3 atom of hydrogen at ambient temperature. The catalyst was filtered off, and the filtrate was evaporated under  
15 reduced pressure to give Methyl 3-[4-(4-pentyloxyphenyl)phenyl]propionate (2.70 g).

1  $\delta$  NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 0.94 (3H, t,  $J=7.0\text{Hz}$ ), 1.28-1.60 (4H, m), 1.60-1.95 (2H, m), 2.55-2.78 (2H, m), 2.98 (2H, t,  $J=7.8\text{Hz}$ ), 3.98 (2H, t,  $J=6.5\text{Hz}$ ),  
20 6.85-7.05 (2H, m), 7.05-7.30 (2H, m), 7.40-7.55 (4H, m)

1  $\delta$  APCI-MASS :  $m/z = 327$  ( $M^++1$ )

25 The following compound was obtained according to a similar manner to that of Preparation 21.

Preparation 22

Preparation 22  
Methyl 3-(6-heptyloxynaphthalen-2-yl)propionate

1  $\delta$  NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 0.90 (3H, t,  $J=6.5\text{Hz}$ ), 1.20-1.70 (8H, m), 1.70-1.93 (2H, m), 2.70 (2H, t,  $J=7.7\text{Hz}$ ), 3.07 (2H, t,  $J=7.7\text{Hz}$ ), 3.67 (3H, s), 4.05 (2H, t,  $J=6.5\text{Hz}$ ), 7.02-7.20 (2H, m), 7.20-7.38 (2H, m), 7.55 (1H, s), 7.66 (1H, dd,  $J=3.0$  and  $8.5\text{Hz}$ )

1  $\delta$  APCI-MASS :  $m/z = 329$  ( $M^++1$ )

CL Preparation 23

To a mixture of Methyl 3-[4-(4-pentylphenyl)phenyl]-acrylate (0.41 g) in tetrahydrofuran (5 ml) was added 3N NaOH aqueous solution (1.3 ml), and the resultant mixture was heated to 85°C for 10 hours. The reaction mixture was poured into a mixture of cold water and ethyl acetate, and adjusted to about pH 2 with 6N hydrochloric acid. The separated organic layer was washed in turn with water and brine, and dried over magnesium sulfate. The magnesium sulfate was filtered off, and the filtrate was evaporated under reduced pressure to give 3-[4-(4-Pentylphenyl)phenyl]acrylic acid (0.41 g).

<sup>1</sup>H NMR (DMSO-d<sub>6</sub>, δ) : 0.87 (3H, t, J=7.5Hz), 1.15-1.46 (4H, m), 1.48-1.70 (2H, m), 2.61 (2H, t, J=7.4Hz), 6.56 (1H, d, J=16.0Hz), 7.29 (2H, d, J=8.2Hz), 7.60 (2H, d, J=4.0Hz), 7.66 (2H, d, J=4.0Hz), 7.68-7.85 (3H, m)

<sup>1</sup>P APCI-MASS : m/z = 295 (M<sup>+</sup>+1)

20 The following compounds (Preparations 24 to 31) were obtained according to a similar manner to that of Preparation 23.

CL Preparation 24

25 CL 3-[4-(4-Pentyloxyphenyl)phenyl]propionic acid

<sup>1</sup>P IR (Nujol) : 1697, 1606, 1500 cm<sup>-1</sup>

<sup>1</sup>P NMR (CDCl<sub>3</sub>, δ) : 0.94 (3H, t, J=7.1Hz), 1.25-1.60 (4H, m), 1.70-1.95 (2H, m), 2.72 (2H, t, J=7.5Hz), 3.00 (2H, t, J=7.5Hz), 3.99 (2H, t, J=6.5Hz), 6.95 (2H, dd, J=2.1 and 6.7Hz), 7.25 (2H, d, J=8.2Hz), 7.40-7.60 (4H, m)

<sup>1</sup>P APCI-MASS : m/z = 313 (M<sup>+</sup>+1)

CL Preparation 25

35 CL 3-[4-(4-Heptylphenyl)phenyl]propionic acid

1 P NMR (CDCl<sub>3</sub>,  $\delta$ ) : 0.88 (3H, t, J=6.8Hz), 1.15-1.50  
(8H, m), 1.50-1.78 (2H, m), 2.65 (2H, t,  
J=7.6Hz), 6.48 (1H, d, J=16.0Hz), 7.27 (2H, d,  
J=8.2Hz), 7.53 (2H, d, J=8.2Hz), 7.63 (4H, m),  
5 7.83 (1H, d, J=16.0Hz)  
P APCI-MASS : m/z = 323 (M<sup>+</sup>+1)

CL Preparation 26

CL 3-[4-(4-Pentylphenyl)phenyl]propionic acid  
10 P NMR (CDCl<sub>3</sub>,  $\delta$ ) : 0.90 (3H, t, J=6.4Hz), 1.20-1.50  
(4H, m), 1.50-1.75 (2H, m), 2.64 (2H, t,  
J=8.0Hz), 2.67 (2H, t, J=9.6Hz), 3.00 (2H, t,  
J=8.0Hz), 7.15-7.38 (4H, m), 7.38-7.60 (4H, m)  
P APCI-MASS : m/z = 297 (M<sup>+</sup>+1)

15 CL Preparation 27

CL 3-(6-Heptyloxynaphthalen-2-yl)propionic acid  
P NMR (CDCl<sub>3</sub>,  $\delta$ ) : 0.90 (3H, t, J=6.5Hz), 1.20-1.65  
(8H, m), 1.75-2.00 (2H, m), 2.75 (2H, t,  
20 J=7.7Hz), 3.09 (2H, t, J=7.7Hz), 4.06 (2H, t,  
J=6.5Hz), 7.05-7.15 (2H, m), 7.15-7.35 (2H, m),  
7.50-7.73 (2H, m)  
P APCI-MASS : m/z = 315 (M<sup>+</sup>+1)

25 CL Preparation 28

CL 3-(6-Heptyloxynaphthalen-2-yl)acrylic acid  
P NMR (CDCl<sub>3</sub>,  $\delta$ ) : 0.90 (3H, t, J=6.5Hz), 1.15-1.60  
(8H, m), 1.75-1.95 (2H, m), 4.09 (2H, t,  
J=6.5Hz), 6.51 (1H, d, J=16.0Hz), 7.09-7.30 (2H,  
30 m), 7.65-8.00 (5H, m)

CL Preparation 29

CL 3-[4-(4-Pentylphenyl)phenyl]propionic acid  
P NMR (CDCl<sub>3</sub>,  $\delta$ ) : 0.91 (3H, t, J=6.5Hz), 1.23-1.50  
35 (4H, m), 1.50-1.80 (2H, m), 2.65 (2H, t,

J=7.6Hz), 7.27 (2H, d, J=8.2Hz), 7.51 (2H, d, J=8.2Hz), 7.58-7.80 (4H, m)

P APCI-MASS : m/z = 325 ( $M^+ + 1$  + MeOH)

5 CL Preparation 30

CL 3-(6-Heptyloxynaphthalen-2-yl)propionic acid

P IR (Nujol) : 2645, 2198, 1670, 1627  $\text{cm}^{-1}$

P NMR (DMSO- $d_6$ ,  $\delta$ ) : 0.85 (3H, t, J=6.5Hz), 1.10-1.60 (8H, m), 1.65-1.90 (2H, m), 4.10 (2H, t,

10 J=6.5Hz), 7.24 (1H, dd, J=2.4 and 8.9Hz), 7.39 (1H, d, J=2.5Hz), 7.55 (1H, dd, J=1.6 and 8.5Hz), 7.8-8.0 (2H, m), 8.22 (1H, d, J=1.6Hz)

P APCI-MASS : m/z = 343 ( $M^+ + 1$  + MeOH)

15 CL Preparation 31

CL 4-[5-(4-Pentyloxyphenyl)isoxazolyl-3-yl]benzoic acid

P IR (KBr) : 2939, 2867, 1681, 1614, 1429, 1255, 1178, 821  $\text{cm}^{-1}$

20 P NMR (DMSO- $d_6$ ,  $\delta$ ) : 0.91 (3H, t, J=7.1Hz), 1.3-1.5 (4H, m), 1.6-1.8 (2H, m), 4.04 (2H, t, J=6.5Hz), 7.11 (2H, d, J=8.9Hz), 7.54 (1H, s), 7.85 (2H, d, J=8.9Hz), 7.98 (2H, d, J=8.6Hz), 8.11 (2H, d, J=8.6Hz)

P APCI-MASS : m/z = 352 ( $M+H$ )<sup>+</sup>

25

CL Preparation 32

To a solution of Ethyl 3-methyl-5-octylbenzo[b]furan-2-carboxylate (1.44 g) in ethanol (20 ml) was added 10% NaOH aqueous solution (2.2 ml), and stirred for 2 hours at ambient temperature, and evaporated under reduced pressure. The residue was adjusted to pH 3.0 with 1N hydrochloric acid, and extracted with ethyl acetate. The organic layer was washed with brine, and dried over magnesium sulfate. The magnesium sulfate was filtered off, and the filtrate was evaporated under reduced pressure to

35



give 3-Methyl-5-octylbenzo[b]furan-2-carboxylic acid (1.00 g).

IR (KBr pelet) : 2923, 1689, 1664, 1581, 1456, 1319, 1159, 933  $\text{cm}^{-1}$

$^1\text{H}$  NMR ( $\text{DMSO}-d_6$ ,  $\delta$ ) : 0.85 (3H, t,  $J=6.7\text{Hz}$ ), 1.2-1.5 (10H, m), 1.5-1.8 (2H, m), 2.49 (3H, s), 2.69 (2H, t,  $J=7.9\text{Hz}$ ), 7.32 (1H, dd,  $J=8.5$  and  $1.7\text{Hz}$ ), 7.52 (1H, d,  $J=8.5\text{Hz}$ ), 7.54 (1H, d,  $J=1.7\text{Hz}$ ), 13.2-13.5 (1H, br)

APCI-MASS :  $m/z = 289$  ( $M^++1$ )

The following compounds (Preparations 33 to 39) were obtained according to a similar manner to that of Preparation 32.

15

Preparation 33

3,4-Dipentyloxybenzoic acid

$^1\text{H}$  NMR ( $\text{DMSO}-d_6$ ,  $\delta$ ) : 0.89 (6H, t,  $J=6.8\text{Hz}$ ), 1.2-1.5 (8H, m), 1.6-1.8 (4H, m), 3.9-4.1 (4H, m), 7.02 (1H, d,  $J=8.4\text{Hz}$ ), 7.43 (1H, d,  $J=1.7\text{Hz}$ ), 7.53 (1H, dd,  $J=8.4$  and  $1.7\text{Hz}$ )

APCI-MASS :  $m/z = 295$  ( $M^++1$ )

Preparation 34

1-(6-Heptyloxy-2-naphthoyl)piperidine-4-carboxylic acid

$^1\text{H}$  NMR ( $\text{DMSO}-d_6$ ,  $\delta$ ) : 0.88 (3H, t,  $J=6.7\text{Hz}$ ), 1.2-2.0 (14H, m), 2.5-2.6 (1H, m), 2.9-3.2 (2H, br), 3.25 (2H, s), 4.09 (2H, t,  $J=6.5\text{Hz}$ ), 7.20 (1H, dd,  $J=8.9$  and  $2.4\text{Hz}$ ), 7.36 (1H, d,  $J=2.3\text{Hz}$ ), 7.43 (1H, dd,  $J=8.4$  and  $1.5\text{Hz}$ ), 7.8-8.0 (3H, m), 12.30 (1H, br)

APCI-MASS :  $m/z = 398$  ( $M^++1$ )

35

CL Preparation 35

CL 7-Octyloxycoumarin-3-carboxylic acid

P IR (KBr) : 1748, 1625, 1558, 1467, 1430, 1386, 1360,  
1257, 1217, 1120  $\text{cm}^{-1}$

5 P NMR (DMSO- $\text{d}_6$ ,  $\delta$ ) : 0.86 (3H, t,  $J=6.8\text{Hz}$ ), 1.2-1.5  
(10H, m), 1.6-1.8 (2H, m), 4.11 (2H, t,  
 $J=6.4\text{Hz}$ ), 6.9-7.1 (2H, m), 7.82 (1H, d,  
 $J=8.9\text{Hz}$ ), 8.72 (1H, s), 12.98 (1H, br)

P APCI-MASS :  $m/z = 319$  ( $M^++1$ )

10

CL Preparation 36

CL 4-(4-Pentyloxyphenyl)cinnamic acid

P IR (Nujol) : 2923, 1675, 1500, 1290, 1223, 985,  
821  $\text{cm}^{-1}$

15 P NMR (DMSO- $\text{d}_6$ ,  $\delta$ ) : 0.90 (3H, t,  $J=7.0\text{Hz}$ ), 1.3-1.5  
(4H, m), 1.6-1.8 (2H, m), 4.01 (2H, t,  $J=6.5\text{Hz}$ ),  
6.54 (1H, d,  $J=16.0\text{Hz}$ ), 7.02 (2H, d,  $J=8.8\text{Hz}$ ),  
7.5-7.8 (7H, m)

P APCI-MASS :  $m/z = 311$  ( $M^++1$ )

20

CL Preparation 37

CL 2-Nonylbenzoxazole-6-carboxylic acid

P NMR (DMSO- $\text{d}_6$ ,  $\delta$ ) : 0.84 (3H, t,  $J=6.7\text{Hz}$ ), 1.2-1.5  
(12H, m), 1.7-1.9 (2H, m), 2.96 (2H, t,  
 $J=7.4\text{Hz}$ ), 7.76 (1H, d,  $J=8.4\text{Hz}$ ), 7.98 (1H, d,  
 $J=8.4\text{Hz}$ ), 8.19 (1H, s)

25

P APCI-MASS :  $m/z = 290$  ( $M^++1$ )

CL Preparation 38

30 CL 2-(4-Hexyloxyphenyl)benzimidazole-5-carboxylic acid

P NMR (DMSO- $\text{d}_6$ ,  $\delta$ ) : 0.8-1.0 (3H, m), 1.3-1.6 (6H, m),  
1.7-1.8 (2H, m), 4.06 (2H, t,  $J=6.4\text{Hz}$ ), 7.12  
(2H, d,  $J=8.8\text{Hz}$ ), 7.6-7.9 (2H, m), 8.1-8.2 (3H,  
m), 13.00 (1H, br)

35

P APCI-MASS :  $m/z = 339$  ( $M^++1$ )

✓ Preparation 39

✓ 2-Nonylbenzimidazole-5-carboxylic acid

5  $\delta$  NMR (DMSO- $d_6$ ,  $\delta$ ) : 0.85 (3H, t,  $J=6.7\text{Hz}$ ), 1.1-1.4 (12H, m), 2.7-2.9 (2H, m), 2.96 (2H, t,  $J=7.6\text{Hz}$ ), 3.6-5.2 (1H, br), 7.66 (1H, d,  $J=8.4\text{Hz}$ ), 7.90 (1H, d,  $J=8.4\text{Hz}$ ), 8.15 (1H, s)

$\delta$  APCI-MASS :  $m/z = 289 (M^++1)$

✓ Preparation 40

10 A solution of 4-[4-(4-Octyloxyphenyl)piperazin-1-yl]benzonitrile (0.5 g) in 20%  $\text{H}_2\text{SO}_4$  aqueous solution (30 ml) and acetic acid (20 ml) was refluxed for 9 hours. The reaction mixture was pulverized with water. The precipitate was collected by filtration, and added to a  
15 mixture of water, tetrahydrofuran and ethyl acetate, and adjusted to pH 2.5 with 1N NaOH aqueous solution. The organic layer was taken, and dried over magnesium sulfate. The magnesium sulfate was filtered off, and the filtrate was evaporated under reduced pressure to give 4-[4-(4-Octyloxyphenyl)piperazin-1-yl]benzoic acid (388 mg).  
20

$\delta$  IR (KBr) : 2929, 1664, 1600, 1510, 1240  $\text{cm}^{-1}$

25  $\delta$  NMR (DMSO- $d_6$ ,  $\delta$ ) : 0.86 (3H, t,  $J=6.6\text{Hz}$ ), 1.2-1.5 (10H, m), 1.5-1.8 (2H, m), 3.13 (4H, t,  $J=5.3\text{Hz}$ ), 3.44 (4H, t,  $J=5.3\text{Hz}$ ), 3.88 (2H, t,  $J=6.5\text{Hz}$ ), 6.83 (2H, d,  $J=9.2\text{Hz}$ ), 6.94 (2H, d,  $J=9.2\text{Hz}$ ), 7.02 (2H, d,  $J=9.0\text{Hz}$ ), 7.79 (2H, d,  $J=9.0\text{Hz}$ )

$\delta$  APCI-MASS :  $m/z = 411 (M^++1)$

30 ✓ Preparation 41

To a suspension of sodium hydride (60% suspension in mineral oil) (0.296 g) in N,N-dimethylformamide (14 ml) was added 1,2,4-triazole (0.511 g) and 4-[4-(8-bromooctyloxy)phenyl]benzoic acid (1 g), and was stirred  
35 for 5 hours at 120°C. The reaction mixture was added to a

5 mixture of water and ethyl acetate, and adjusted to pH 2.5 with conc. hydrochloric acid. The organic layer was taken and dried over magnesium sulfate. The magnesium sulfate was filtered off, and the filtrate was evaporated under reduced pressure to give 4-[4-[8-(1,2,4-Triazol-1-yl)octyloxy]phenyl]benzoic acid (0.81 g).

IR (KBr) : 2940, 1689, 1604, 1297, 1189  $\text{cm}^{-1}$

10  $^1\text{H}$  NMR (DMSO- $d_6$ ,  $\delta$ ) : 1.1-1.53 (8H, m), 1.6-1.9 (4H, m), 4.00 (2H, t,  $J=6.3\text{Hz}$ ), 4.16 (2H, t,  $J=7.0\text{Hz}$ ), 7.03 (2H, d,  $J=8.7\text{Hz}$ ), 7.67 (2H, d,  $J=8.7\text{Hz}$ ), 7.75 (2H, d,  $J=8.4\text{Hz}$ ), 7.95 (1H, s), 7.99 (2H, d,  $J=8.4\text{Hz}$ ), 8.51 (1H, s), 12.9 (1H, s)

$^1\text{H}$  APCI-MASS :  $m/z = 394 (M^++1)$

15

Preparation 42

20 A mixture of 2-Carbamoyl-5-methoxybenzo[b]thiophene (2.0 g), acetic acid (5 ml) and 48% hydrobromic acid (20 ml) was stirred for 16 hours at  $110^\circ\text{C}$ , and the mixture was poured into the ice-water. The resulting precipitate was collected by filtration, and dried to give 5-Hydroxybenzo[b]thiophene-2-carboxylic acid (1.66 g).

25  $^1\text{H}$  NMR (DMSO- $d_6$ ,  $\delta$ ) : 7.03 (1H, dd,  $J=8.8$  and  $0.6\text{Hz}$ ), 7.31 (1H, d,  $J=0.6\text{Hz}$ ), 7.81 (1H, d,  $J=8.8\text{Hz}$ ), 7.96 (1H, s), 9.64 (1H, s), 13.32 (1H, s)

$^1\text{H}$  APCI-MASS :  $m/z = 195 (M^++1)$

Preparation 43

30 A solution of (S)-2-Tert-butoxycarbonyl-1,2,3,4-tetrahydro-7-hydroxyisoquinoline-3-carboxylic acid (1 g) in a mixture of 10% NaOH aqueous solution (2.73 ml) and dimethylsulfoxide (11 ml) was stirred for half an hour at  $80^\circ\text{C}$ . Then, octyl bromide (0.589 ml) was added thereto, and stirred for 4 hours at  $60^\circ\text{C}$ . The reaction mixture was  
35 added to a mixture of water and ethyl acetate, and

adjusted to pH 2.5 with conc. hydrochloric acid. The organic layer was taken, and dried over magnesium sulfate. The magnesium sulfate was filtered off, and the filtrate was evaporated under reduced pressure to give (S)-2-Tert-butoxycarbonyl-1,2,3,4-tetrahydro-7-octyloxyisoquinoline-3-carboxylic acid (1.30 g).

IR (Neat) : 2929, 1743, 1704, 1164  $\text{cm}^{-1}$

NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 0.89 (3H, t,  $J=6.1\text{Hz}$ ), 1.1-1.6 (10H, m), 1.41 + 1.51 (9H, s, cis + trans), 1.75 (2H, quint,  $J=6.5\text{Hz}$ ), 3.10 (2H, m), 3.90 (2H, t,  $J=3.9\text{Hz}$ ), 4.42 (1H, d,  $J=16.8\text{Hz}$ ), 4.65 (1H, d,  $J=16.8\text{Hz}$ ), 4.74 + 5.09 (1H, m, cis + trans), 6.5-6.6 (2H, m), 7.03 (1H, d,  $J=8.3\text{Hz}$ )

APCI-MASS :  $m/z = 306$  ( $M^+ + 1$ -Boc)

The following compounds (Preparations 44 to 45) were obtained according to a similar manner to that of Preparation 43.

Preparation 44

5-Octyloxybenzo[b]thiophene-2-carboxylic acid

IR (KBr) : 1673, 1666, 1600, 1517, 1409, 1267, 1214, 1153, 865  $\text{cm}^{-1}$

NMR ( $\text{DMSO-d}_6$ ,  $\delta$ ) : 0.86 (3H, t,  $J=6.7\text{Hz}$ ), 1.2-1.5 (10H, m), 1.7-1.9 (2H, m), 4.02 (2H, t,  $J=6.4\text{Hz}$ ), 7.13 (1H, dd,  $J=8.9$  and  $0.6\text{Hz}$ ), 7.51 (1H, d,  $J=0.6\text{Hz}$ ), 7.90 (1H, d,  $J=9.0\text{Hz}$ ), 7.99 (1H, s)

APCI-MASS :  $m/z = 307$  ( $M^+ + 1$ )

Preparation 45

4-[4-(4-Hexyloxyphenyl)piperazin-1-yl]benzoic acid dihydrochloride

IR (KBr) : 1668, 1600, 1510, 1228  $\text{cm}^{-1}$

NMR ( $\text{DMSO-d}_6$ ,  $\delta$ ) : 0.88 (3H, t,  $J=6.9\text{Hz}$ ), 1.2-1.5

(6H, m), 1.6-1.9 (2H, m), 3.0-3.2 (4H, m), 3.3-3.5 (4H, m), 3.88 (2H, t,  $J=6.3\text{Hz}$ ), 6.83 (2H, d,  $J=9\text{Hz}$ ), 6.9-7.1 (4H, m), 7.79 (2H, d,  $J=8.8\text{Hz}$ ), 12.32 (1H, s)

5             $\rho$     APCI-MASS :  $m/z = 383$  ( $M+H^+$ )

$\checkmark$  Preparation 46

To a suspension of dimethyl terephthalate (1.94 g) and potassium t-butoxide (2.24 g) in tetrahydrofuran (30 ml) was added 4-pentyloxyacetophenone (1.59 g) in tetrahydrofuran (10 ml) at 70°C dropwise. The mixture was refluxed for 30 minutes and poured into 1N HCl (50 ml). The mixture was extracted with ethyl acetate (100 ml) and the organic layer was washed with H<sub>2</sub>O (100 ml), brine (100 ml) and evaporated under reduced pressure. The residue was triturated with acetonitrile (20 ml), collected by filtration and dried under reduced pressure to give 1-(4-Methoxycarbonylphenyl)-3-(4-pentyloxyphenyl)propane-1,3-

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15  
20

$\rho$  IR (KBr) : 3475, 2956, 2923, 1720, 1606, 1508, 1284, 1176, 1108, 769  $\text{cm}^{-1}$

$\rho$  NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 0.95 (3H, t,  $J=7.0\text{Hz}$ ), 1.3-1.5 (4H, m), 1.7-2.0 (2H, m), 3.96 (3H, s), 4.04 (2H, t,  $J=6.5\text{Hz}$ ), 6.82 (1H, s), 6.96 (2H, d,  $J=8.9\text{Hz}$ ), 8.0-8.1 (4H, m), 8.14 (2H, m,  $J=8.7\text{Hz}$ ), 12-13 (1H, br)

25

$\rho$  APCI-MASS :  $m/z = 369$  ( $M+H^+$ )

$\checkmark$  Preparation 47

The solution of 1-(4-Methoxycarbonylphenyl)-3-(4-pentyloxyphenyl)propane-1,3-dione (1.00 g) and hydroxylamine hydrochloride (567 mg) in methanol (10 ml) was refluxed for 10 hours. The reaction mixture was diluted with ethyl acetate (50 ml) and washed with water (50 ml x 2), brine (50 ml). The organic layer was dried

30  
35

over magnesium sulfate and the solvents were removed under reduced pressure. The residue was triturated with acetonitrile (10 ml), collected by filtration, and dried under reduced pressure to give Methyl 4-[5-(4-pentyloxyphenyl)isoxazol-3-yl]benzoate (0.74 g).

5  $\rho$  IR (KBr) : 2942, 2873, 1716, 1616, 1508, 1280, 1108  $\text{cm}^{-1}$

10  $\rho$  NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 0.95 (3H, t,  $J=6.9\text{Hz}$ ), 1.3-1.6 (4H, m), 1.8-2.0 (2H, m), 3.95 (3H, s), 4.02 (2H, t,  $J=6.5\text{Hz}$ ), 6.74 (1H, s), 6.99 (2H, d,  $J=8.8\text{Hz}$ ), 7.76 (2H, d,  $J=8.8\text{Hz}$ ), 7.93 (2H, d,  $J=8.5\text{Hz}$ ), 8.14 (2H, d,  $J=8.5\text{Hz}$ )

$\rho$  APCI-MASS :  $m/z = 366$  ( $M+H$ )<sup>+</sup>

15 Preparation 48

A solution of 4-[4-(8-Bromooctyloxy)phenyl]benzoic acid (1 g) in a mixture of sodium methylate (28% solution in methanol) (10 ml) and N,N-dimethylformamide (5 ml) was refluxed for 5 hours. The reaction mixture was added to a mixture of water and ethyl acetate and adjusted to pH 2.0 with conc. HCl. The organic layer was taken and dried over magnesium sulfate. The magnesium sulfate was filtered off, and the filtrate was evaporated under reduced pressure to give 4-[4-(8-Methoxyoctyloxy)phenyl]benzoic acid (0.77 g).

25  $\rho$  IR (KBr) : 2935, 1685, 835, 773  $\text{cm}^{-1}$

30  $\rho$  NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 1.27-1.7 (10H, m), 1.7-1.95 (2H, m), 3.34 (3H, s), 3.38 (2H, t,  $J=6.4\text{Hz}$ ), 4.01 (2H, t,  $J=6.5\text{Hz}$ ), 6.99 (2H, d,  $J=8.7\text{Hz}$ ), 7.58 (2H, d,  $J=8.7\text{Hz}$ ), 7.66 (2H, d,  $J=8.4\text{Hz}$ ), 8.15 (2H, d,  $J=8.4\text{Hz}$ )

$\rho$  APCI-MASS :  $m/z = 339$  ( $M^+ + H - H_2O$ )

35 Preparation 49

To a suspension of 1-Hydroxybenzotriazole (0.283 g)

and 6-octyloxymethylpicolinic acid (0.505 g) in dichloromethane (15 ml) was added 1-ethyl-3-(3'-dimethylaminopropyl)carbodiimide hydrochloride (WSCD·HCl) (0.473 g), and stirred for 3 hours at ambient temperature.

5 The reaction mixture was poured into water. The organic layer was taken, and dried over magnesium sulfate. The magnesium sulfate was filtered off, and the filtrate was evaporated under reduced pressure to give 1-(6-Octyloxymethylpicolinoyl)benzotriazole 3-oxide (737 mg).

10  $\rho$  IR (Neat) : 1793, 1654, 1591, 1039  $\text{cm}^{-1}$

The following compounds [Preparations 50 to 66] were obtained according to a similar manner to that of Preparation 49.

15

CL Preparation 50

CL 1-[4-(4-Octyloxyphenyl)piperazin-1-yl]benzoyl]-benzotriazole 3-oxide

$\rho$  IR (KBr) : 1783, 1600, 1511, 1232, 1184  $\text{cm}^{-1}$

20  $\rho$  NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 0.89 (3H, t,  $J=6.6\text{Hz}$ ), 1.2-1.65 (10H, m), 1.65-1.9 (2H, m), 3.24 (4H, t,  $J=5.3\text{Hz}$ ), 3.62 (4H, t,  $J=5.3\text{Hz}$ ), 3.93 (2H, t,  $J=6.5\text{Hz}$ ), 6.8-7.1 (6H, m), 7.35-7.63 (3H, m), 8.0-8.25 (3H, m)

25

CL Preparation 51

CL 1-[4-[4-[8-(1,2,4-Triazol-1-yl)octyloxy]phenyl]-benzoyl]benzotriazole 3-oxide

$\rho$  IR (KBr) : 1776, 1600, 1193, 983  $\text{cm}^{-1}$

30  $\rho$  NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 1.2-2.0 (12H, m), 4.03 (2H, t,  $J=6.4\text{Hz}$ ), 4.18 (2H, t,  $J=7.1\text{Hz}$ ), 7.02 (2H, d,  $J=8.7\text{Hz}$ ), 7.4-7.63 (3H, m), 7.63 (2H, d,  $J=8.7\text{Hz}$ ), 7.79 (2H, d,  $J=8.3\text{Hz}$ ), 7.95 (1H, s), 8.06 (1H, s), 8.12 (1H, d,  $J=7.7\text{Hz}$ ), 8.32 (2H, d,  $J=8.3\text{Hz}$ )

35



P APCI-MASS :  $m/z = 511 (M^+ + 1)$

CL Preparation 52

CL 1-[2-Methyl-2-(4-octyloxyphenoxy)propionyl]-  
5 benzotriazole 3-oxide

P IR (Neat) : 2927, 1810, 1504, 1047  $\text{cm}^{-1}$

CL Preparation 53

CL 1-[2-(4-Octyloxyphenoxy)propionyl]benzotriazole  
10 3-oxide

P IR (KBr) : 2954, 1812, 1513, 1232  $\text{cm}^{-1}$

CL Preparation 54

CL 1-[(S)-2-tert-Butoxycarbonyl-1,2,3,4-tetrahydro-7-  
15 octyloxyisoquinolin-3-yl-carbonyl]benzotriazole 3-oxide

P IR (Neat) : 2929, 1816, 1739, 1704, 1392  $\text{cm}^{-1}$

CL Preparation 55

CL Succinimido 4-(4-n-octyloxyphenyl)piperazine-1-  
20 carboxylate

P IR (KBr) : 2925, 1758, 1743, 1513, 1241  $\text{cm}^{-1}$

P NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 0.89 (3H, t,  $J=6.8\text{Hz}$ ), 1.2-1.5  
(10H, m), 1.65-1.85 (2H, m), 2.83 (4H, s),  
3.0-3.2 (2H, m), 3.6-3.85 (2H, m), 3.91 (2H, t,  
25  $J=6.5\text{Hz}$ ), 6.84 (2H, dd,  $J=8.5$  and  $2.7\text{Hz}$ ), 6.90  
(2H, dd,  $J=8.5$  and  $2.7\text{Hz}$ )

P APCI-MASS :  $m/z = 432 (M^+ + 1)$

CL Preparation 56

CL (6-Heptyloxy-2-naphthyl)methylsuccinimido carbonate  
30

P IR (KBr) : 1878, 1832, 1787, 1735, 1209  $\text{cm}^{-1}$

P NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 0.90 (3H, t,  $J=6.2\text{Hz}$ ), 1.2-1.6 (8H,  
m), 1.73-2.0 (2H, m), 2.83 (4H, s), 4.07 (2H, t,  
 $J=6.5\text{Hz}$ ), 5.44 (2H, s), 7.13 (1H, d,  $J=2.4\text{Hz}$ ),  
35 7.17 (1H, dd,  $J=8.8$  and  $2.4\text{Hz}$ ), 7.44 (1H, dd,

004423 0249

J=8.4 and 1.6Hz), 7.67-7.85 (3H, m)

CL Preparation 57

- CL  
P 1-(3,4-Dipentyloxybenzoyl)benzotriazole 3-oxide  
5 IR (KBr) : 2952, 1774, 1594, 1515, 1430, 1272, 1147,  
1069  $\text{cm}^{-1}$   
P NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 0.9-1.1 (6H, m), 1.3-1.6 (8H, m),  
1.8-2.1 (4H, m), 4.0-4.2 (4H, m), 6.99 (1H, d,  
J=8.5Hz), 7.4-7.6 (3H, m), 7.68 (1H, d,  
10 J=2.0Hz), 7.92 (1H, dd, J=8.5 and 2.0Hz), 8.10  
(1H, d, J=8.5Hz)  
P APCI-MASS :  $m/z = 412$  ( $M^+ + 1$ )

CL Preparation 58

- 15 CL 1-(7-Octyloxy coumarin-3-yl-carbonyl)benzotriazole  
3-oxide  
P IR (KBr) : 2925, 1754, 1716, 1610, 1548, 1282, 1199,  
1172, 1139, 1064, 781, 750  $\text{cm}^{-1}$   
P NMR ( $\text{DMSO}-d_6$ ,  $\delta$ ) : 0.86 (3H, t, J=7.8Hz), 1.2-1.5  
20 (10H, m), 1.6-1.8 (2H, m), 4.11 (2H, t,  
J=6.5Hz), 6.9-7.1 (2H, m), 7.41 (1H, t,  
J=7.2Hz), 7.54 (1H, t, J=7.2Hz), 7.72 (1H, d,  
J=8.3Hz), 7.82 (1H, d, J=8.3Hz), 7.99 (1H, d,  
J=8.3Hz), 8.72 (1H, s)  
25 P APCI-MASS :  $m/z = 436$  ( $M^+ + 1$ )

CL Preparation 59

- CL 1-[4-(4-Pentyloxyphenyl)cinnamoyl]benzotriazole 3-  
oxide  
30 P IR (Nujol) : 2854, 1778, 1708, 1620, 1597, 1494,  
1459, 1434, 1377, 1350, 1250, 1188, 1138, 1086,  
978  $\text{cm}^{-1}$

CL Preparation 60

- 35 CL 1-(5-Octyloxybenzo[b]thiophen-2-yl-carbonyl)-

benzotriazole 3-oxide

IR (KBr) : 2950, 1776, 1517, 1342, 1211, 1151  $\text{cm}^{-1}$

NMR ( $\text{DMSO-d}_6$ ,  $\delta$ ) : 0.86 (3H, t,  $J=6.7\text{Hz}$ ), 1.2-1.5 (10H, m), 1.7-1.9 (2H, m), 4.01 (2H, t,

5  $J=6.4\text{Hz}$ ), 7.13 (1H, dd,  $J=8.8$  and  $2.4\text{Hz}$ ), 7.42 (1H, d,  $J=7.1\text{Hz}$ ), 7.5-7.6 (3H, m), 7.72 (1H, d,  $J=8.4\text{Hz}$ ), 7.89 (1H, d,  $J=8.8\text{Hz}$ ), 7.9-8.1 (2H, m)

APCI-MASS :  $m/z = 424$  ( $M^++1$ )

10 Preparation 61

1-(3-Methyl-5-octylbenzo[b]furan-2-yl-carbonyl)-benzotriazole 3-oxide

IR (KBr) : 1776, 1575, 1469, 1363, 1324, 1276, 1114, 1027  $\text{cm}^{-1}$

15 NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 0.89 (3H, t,  $J=6.7\text{Hz}$ ), 1.2-1.5 (10H, m), 2.6-2.8 (2H, m), 2.71 (3H, s), 2.76 (2H, t,  $J=7.4\text{Hz}$ ), 7.4-7.6 (6H, m), 8.12 (1H, s)

APCI-MASS :  $m/z = 406$  ( $M^++1$ )

20 Preparation 62

1-(2-Nonylbenzoxazol-5-yl-carbonyl)benzotriazole 3-oxide

IR (KBr) : 2980, 1783, 1623, 1573, 1276, 1151, 1091, 989  $\text{cm}^{-1}$

25 NMR ( $\text{DMSO-d}_6$ ,  $\delta$ ) : 0.84 (3H, t,  $J=6.8\text{Hz}$ ), 1.1-1.4 (12H, m), 1.81 (2H, t,  $J=7.2\text{Hz}$ ), 2.96 (3H, t,  $J=7.4\text{Hz}$ ), 7.41 (1H, t,  $J=7.0\text{Hz}$ ), 7.54 (1H, t,  $J=7.0\text{Hz}$ ), 7.74 (2H, t,  $J=7.0\text{Hz}$ ), 7.98 (2H, d,  $J=7.0\text{Hz}$ ), 8.19 (1H, s)

30 APCI-MASS :  $m/z = 407$  ( $M^++1$ )

Preparation 63

1-[2-(4-Hexyloxyphenyl)benzimidazol-5-yl-carbonyl]-benzotriazole 3-oxide

35 IR (KBr) : 3160, 2931, 2863, 1778, 1612, 1502, 1448,

1388, 1294, 1247, 1174, 1097, 1010, 732  $\text{cm}^{-1}$

$\rho$  NMR ( $\text{DMSO}-d_6$ ,  $\delta$ ) : 0.89 (3H, t,  $J=6.7\text{Hz}$ ), 1.2-1.5 (6H, m), 1.7-1.8 (2H, m), 4.08 (2H, t,  $J=6.4\text{Hz}$ ), 7.16 (2H, d,  $J=8.7\text{Hz}$ ), 7.6-8.4 (9H, m), 8.3-8.6 (1H, br)

5

$\rho$  APCI-MASS :  $m/z = 456 (M^++1)$

Preparation 64

$\rho$  1-[4-[4-(8-Methoxyoctyloxy)phenyl]benzoyl]-benzotriazole-3-oxide

10

$\rho$  IR (KBr) : 2931, 1793, 1770, 1600  $\text{cm}^{-1}$

$\rho$  NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 1.2-1.7 (10H, m), 1.7-1.93 (2H, m), 3.34 (3H, s), 3.38 (2H, t,  $J=6.4\text{Hz}$ ), 4.03 (2H, t,  $J=6.5\text{Hz}$ ), 7.03 (2H, d,  $J=8.8\text{Hz}$ ), 7.4-7.7 (3H, m), 7.63 (2H, d,  $J=8.8\text{Hz}$ ), 7.79 (2H, d,  $J=8.6\text{Hz}$ ), 8.12 (1H, d,  $J=8.2\text{Hz}$ ), 8.32 (2H, d,  $J=8.6\text{Hz}$ )

15

Preparation 65

$\rho$  1-[4-[4-(4-Hexyloxyphenyl)piperazin-1-yl]benzoyl]benzotriazole 3-oxide

20

$\rho$  IR (KBr) : 1770, 1604, 1510, 1232, 1186  $\text{cm}^{-1}$

$\rho$  NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 0.91 (3H, t,  $J=6.6\text{Hz}$ ), 1.2-1.6 (6H, m), 1.6-1.9 (2H, m), 3.1-3.3 (4H, m), 3.5-3.7 (4H, m), 3.93 (2H, t,  $J=6.5\text{Hz}$ ), 6.87 (2H, d,  $J=9.2\text{Hz}$ ), 6.96 (2H, d,  $J=9.2\text{Hz}$ ), 7.00 (2H, d,  $J=9.0\text{Hz}$ ), 7.3-7.7 (3H, m), 8.10 (1H, d,  $J=8.2\text{Hz}$ ), 8.15 (2H, d,  $J=9.0\text{Hz}$ )

25

$\rho$  APCI-MASS :  $m/z = 500 (M+H^+)$

30

Preparation 66

$\rho$  1-[4-[5-(4-Pentyloxyphenyl)isoxazol-3-yl]benzoyl]-benzotriazole 3-oxide

$\rho$  IR (KBr) : 2950, 2837, 1774, 1616, 1508, 1452, 1251, 1006  $\text{cm}^{-1}$

35

1 NMR (CDCl<sub>3</sub>,  $\delta$ ) : 0.95 (3H, t, J=7.1Hz), 1.3-1.5 (4H, m), 1.8-2.0 (2H, m), 4.04 (2H, t, J=6.5Hz), 6.81 (1H, s), 7.0-7.1 (3H, m), 7.4-7.6 (3H, m), 7.80 (2H, d, J=8.8Hz), 8.0-8.2 (3H, m), 8.40 (2H, d, J=8.4Hz)

5 P APCI-MASS : m/z = 469 (M+H)<sup>+</sup>

CL Preparation 67

To a suspension of 1-hydroxybenzotriazole (0.20 g) and 4-(4-pentylphenyl)cinnamic acid (0.40 g) in dichloromethane (12.0 ml) was added 1-ethyl-3-(3'-dimethylaminopropyl)carbodiimide hydrochloride (0.33 g) (WSCD·HCl), and the mixture was stirred for 12 hours at ambient temperature. The reaction mixture was diluted with dichloromethane, and washed with brine, and dried over magnesium sulfate. After magnesium sulfate was filtered off, evaporation of the filtrate and trituration with acetonitrile gave 1-[4-(4-

10  
15  
20

P NMR (CDCl<sub>3</sub>,  $\delta$ ) : 0.91 (3H, t, J=6.6Hz), 1.20-1.50 (4H, m), 1.50-1.75 (2H, m), 2.66 (2H, t, J=8.0Hz), 7.20-8.25 (11H, m), 8.55 (1H, d, J=8.4Hz)

P APCI-MASS : m/z = 412 (M<sup>+</sup>+1)

25

The following compounds (Preparations 68 to 73) were obtained according to a similar manner to that of Preparation 67.

30 CL Preparation 68

CL 1-[3-[4-(4-Pentyloxyphenyl)phenyl]-2-propanoyl]-benzotriazole 3-oxide

P NMR (CDCl<sub>3</sub>,  $\delta$ ) : 0.90-1.05 (3H, m), 1.30-1.65 (4H, m), 1.70-1.95 (2H, m), 3.10-3.60 (4H, m), 3.90-4.10 (2H, m), 6.88-7.08 (2H, m),

35

7.20-8.50 (10H, m)

APCI-MASS :  $m/z = 430 (M^+ + 1)$

CL Preparation 69

5 CL 1-[4-(4-Heptylphenyl)cinnamoyl]benzotriazole 3-oxide

APCI-MASS :  $m/z = 440 (M^+ + 1)$   
NMR (CDCl<sub>3</sub>,  $\delta$ ) : 0.89 (3H, t, J=6.7Hz), 1.20-1.50 (8H, m), 1.50-1.80 (2H, m), 2.66 (2H, t, J=7.6Hz), 6.70-8.60 (12H, m)

10

CL Preparation 70

CL 1-[3-[4-(4-Pentylphenyl)phenyl]-2-propanoyl]-benzotriazole 3-oxide

APCI-MASS :  $m/z = 414 (M^+ + 1)$   
NMR (CDCl<sub>3</sub>,  $\delta$ ) : 0.90 (3H, t, J=6.8Hz), 1.20-1.50 (4H, m), 1.50-1.76 (2H, m), 2.63 (2H, t, J=7.4Hz), 3.21 (2H, t, J=7.3Hz), 3.51 (2H, t, J=7.3Hz), 7.20-7.45 (4H, m), 7.45-7.70 (5H, m), 7.78 (1H, dt, J=1.0 and 7.2Hz), 8.00 (1H, d, J=8.2Hz), 8.42 (1H, d, J=8.4Hz)

20

CL Preparation 71

CL 1-[3-(6-Heptyloxynaphthalen-2-yl)propanoyl]-benzotriazole 3-oxide

APCI-MASS :  $m/z = 432 (M^+ + 1)$   
NMR (CDCl<sub>3</sub>,  $\delta$ ) : 0.80-1.10 (3H, m), 1.20-1.70 (8H, m), 1.70-2.00 (2H, m), 3.10-3.70 (4H, m), 4.00-4.18 (2H, m), 6.80-8.50 (10H, m)

30 CL Preparation 72

CL 1-[3-(6-Heptyloxynaphthalen-2-yl)propenoyl]-benzotriazole 3-oxide

APCI-MASS :  $m/z = 432 (M^+ + 1)$   
NMR (CDCl<sub>3</sub>,  $\delta$ ) : 0.90 (3H, t, J=6.5Hz), 1.20-1.65 (8H, m), 1.75-1.95 (2H, m), 4.10 (2H, d, J=6.5Hz), 6.75-8.62 (8H, m)

APCI-MASS :  $m/z = 430 (M^+ + 1)$

Preparation 73

1-(4-Hexylphenylbenzoyl)benzotriazole 3-oxide

NMR ( $CDCl_3$ ,  $\delta$ ) : 0.90 (3H, t,  $J=4.4$ Hz), 1.2-1.5 (6H, m), 1.6-1.8 (2H, m), 2.68 (2H, t,  $J=8.0$ Hz), 7.32 (2H, d,  $J=8.2$ Hz), 7.4-7.7 (5H, m), 7.81 (2H, d,  $J=6.6$ Hz), 8.10 (2H, d,  $J=8.1$ Hz), 8.32 (2H, d,  $J=7.6$ Hz)

APCI-MASS :  $m/z = 400 (M^+ + 1)$

Preparation 74

To a solution of 4-octyloxyphenol (1 g) in dimethylformamide (10 ml) and pyridine (0.364 ml) was added N,N'-disuccinimidylcarbonate (1.16 g). The mixture was stirred for 12 hours at ambient temperature. The reaction mixture was added to a mixture of water and ethyl acetate. The organic layer was taken, and dried over magnesium sulfate. The magnesium sulfate was filtered off, and the filtrate was evaporated under reduced pressure to give 4-Octyloxyphenylsuccinimidyl carbonate (0.59 g).

IR (KBr) : 2927, 1876, 1832, 1735  $cm^{-1}$

NMR ( $CDCl_3$ ,  $\delta$ ) : 0.89 (3H, t,  $J=6.3$ Hz), 1.2-1.55 (10H, m), 1.67-1.87 (2H, m), 2.87 (4H, s), 3.94 (2H, t,  $J=6.5$ Hz), 6.89 (2H, d,  $J=9.2$ Hz), 7.17 (2H, d,  $J=9.2$ Hz)

APCI-MASS :  $m/z = 364 (M^+ + 1)$

The following compounds (Preparations 75 to 88) were obtained according to a similar manner to that of Preparation 1.

Preparation 75

Methyl 4-[4-(6-phenylpyridazin-3-yl-oxy)phenyl]benzoate

IR (KBr) : 1708, 1427, 1280, 1187, 1112  $cm^{-1}$

$\rho$  NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 3.95 (3H, s), 7.2-7.7 (10H, m),  
7.92 (1H, d,  $J=9.2\text{Hz}$ ), 8.0-8.2 (4H, m)

$\rho$  APCI-MASS :  $m/z = 383$  ( $M+H$ )<sup>+</sup>

5  $\checkmark$  Preparation 76

$\checkmark$  Methyl 4-[4-(5-bromopentyloxy)phenyl]benzoate

$\rho$  IR (KBr) : 2946, 2871, 1716, 1602, 1294, 1199, 1112,  
837  $\text{cm}^{-1}$

10  $\rho$  NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 1.7-2.0 (6H, m), 3.45 (2H, t,  
 $J=6.7\text{Hz}$ ), 3.93 (3H, s), 4.02 (2H, t,  $J=6.1\text{Hz}$ ), 6.97  
(2H, d,  $J=8.7\text{Hz}$ ), 7.56 (2H, d,  $J=8.7\text{Hz}$ ), 7.61 (2H,  
d,  $J=8.3\text{Hz}$ ), 8.07 (2H, d,  $J=8.3\text{Hz}$ )

$\rho$  APCI-MASS :  $m/z = 378$  ( $M+H$ )<sup>+</sup>

15  $\checkmark$  Preparation 77

$\checkmark$  Methyl 4-[4-(5-phenoxy-pentyloxy)phenyl]benzoate

$\rho$  IR (KBr) : 2944, 2931, 1720, 1600, 1492, 1197,  
1110  $\text{cm}^{-1}$

20  $\rho$  NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 1.6-1.8 (2H, m), 1.8-2.0 (4H, m),  
3.93 (3H, s), 4.00 (2H, t,  $J=6.3\text{Hz}$ ), 4.04 (2H, t,  
 $J=6.3\text{Hz}$ ), 6.9-7.1 (5H, m), 7.3-7.4 (2H, m), 7.56  
(2H, d,  $J=8.7\text{Hz}$ ), 7.62 (2H, d,  $J=8.3\text{Hz}$ ), 8.07 (2H,  
d,  $J=8.3\text{Hz}$ )

$\rho$  APCI-MASS :  $m/z = 391$  ( $M+H$ )<sup>+</sup>

25

$\checkmark$  Preparation 78

$\checkmark$  1-[2-(4-Cyclohexylphenylamino)ethyl]-2-oxazolidone  
hydrochloride

$\rho$  IR (KBr) : 2923.6, 2852.2, 1747.2, 1683.6  $\text{cm}^{-1}$

30  $\rho$  NMR ( $\text{DMSO}-d_6$ ,  $\delta$ ) : 1.1-1.5 (6H, m), 1.6-1.9 (4H, m),  
2.3-2.6 (1H, m), 3.3-3.5 (4H, m), 3.58 (2H, dd,  
 $J=9.4$  and  $7.4\text{Hz}$ ), 4.22 (2H, dd,  $J=9.4$  and  $7.4\text{Hz}$ ),  
7.1-7.4 (4H, m)

35  $\checkmark$  Preparation 79



CL

Methyl 4-[4-(8-hydroxyoctyloxy)phenyl]benzoate

P

IR (KBr) : 3250, 2933, 2856, 1724, 1602, 1436, 1292,  
1199  $\text{cm}^{-1}$

P

5

NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 1.3-1.9 (12H, m), 3.6-3.8 (2H, br),  
3.93 (3H, s), 4.00 (2H, t,  $J=6.7\text{Hz}$ ), 4.82 (1H, s),  
7.68 (2H, d,  $J=8.7\text{Hz}$ ), 7.56 (2H, d,  $J=8.7\text{Hz}$ ), 7.62  
(2H, d,  $J=8.3\text{Hz}$ ), 8.07 (2H, d,  $J=8.3\text{Hz}$ )

P

APCI-MASS :  $m/z = 357$  ( $M+H^+$ )

10 CL Preparation 80

CL

Methyl 4-[4-(6-bromohexyloxy)phenyl]benzoate

P

IR (KBr) : 2937, 2861, 1724, 1602, 1529, 1436, 1292,  
1199, 1112  $\text{cm}^{-1}$

P

15

NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 1.5-2.0 (8H, m), 3.43 (2H, t,  
 $J=6.8\text{Hz}$ ), 3.93 (3H, s), 4.02 (2H, t,  $J=6.3\text{Hz}$ ), 6.98  
(2H, d,  $J=8.8\text{Hz}$ ), 7.56 (2H, d,  $J=8.8\text{Hz}$ ), 7.62 (2H,  
d,  $J=8.4\text{Hz}$ ), 8.07 (2H, d,  $J=8.4\text{Hz}$ )

P

APCI-MASS :  $m/z = 391$  ( $M+H^+$ )

20 CL Preparation 81

CL

4-[4-(5-Bromopentyloxy)phenyl]bromobenzene

P

IR (KBr) : 2942, 2867, 1604, 1515, 1477, 1286  $\text{cm}^{-1}$

P

25

NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 1.5-2.0 (6H, m), 3.44 (2H, t,  
 $J=6.7\text{Hz}$ ), 3.99 (2H, t,  $J=6.2\text{Hz}$ ), 6.95 (2H, d,  
 $J=8.7\text{Hz}$ ), 7.3-7.6 (6H, m)

P

APCI-MASS :  $m/z = 399$  ( $M+H^+$ )

CL

Preparation 82

CL

30

8-[4-(4-Methoxycarbonylphenyl)phenoxy]octanoyl  
piperidine

P

IR (KBr) : 2935, 2852, 1720, 1639, 1604, 1438,  
1292  $\text{cm}^{-1}$

P

35

NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 1.3-1.9 (16H, m), 2.34 (2H, d,  
 $J=7.6\text{Hz}$ ), 3.4-3.6 (4H, m), 3.93 (3H, s), 3.99 (2H,  
t,  $J=6.4\text{Hz}$ ), 6.97 (2H, d,  $J=8.8\text{Hz}$ ), 7.55 (2H, d,

J=8.6Hz), 7.61 (2H, d, J=8.6Hz), 8.07 (2H, d, J=8.6Hz)

⌈ APCI-MASS : m/z = 438 (M+H<sup>+</sup>)

5 CL Preparation 83

CL Methyl 6-[4-(4-n-heptyloxyphenyl)piperazin-1-yl]nicotinate

⌈ IR (KBr) : 2933, 2859, 1726, 1608, 1513, 1430, 1280, 1245 cm<sup>-1</sup>

10 ⌈ NMR (CDCl<sub>3</sub>, δ) : 0.89 (3H, t, J=6.7Hz), 1.2-1.8 (10H, m), 3.17 (4H, t, J=4.9Hz), 3.8-4.0 (9H, m), 6.65 (1H, d, J=9.1Hz), 6.86 (2H, d, J=9.1Hz), 6.96 (2H, d, J=9.1Hz), 8.05 (1H, dd, J=9.1 and 2.3Hz), 8.82 (1H, d, J=2.3Hz)

15 ⌈ APCI-MASS : m/z = 412 (M+H<sup>+</sup>)

CL Preparation 84

CL Methyl 6-[4-[4-(8-bromooctyloxy)phenyl]piperazin-1-yl]nicotinate

20 ⌈ IR (KBr) : 2933, 2861, 1724, 1608, 1513, 1430, 1280 cm<sup>-1</sup>

⌈ NMR (CDCl<sub>3</sub>, δ) : 1.2-2.0 (12H, m), 3.17 (4H, t, J=5.0Hz), 3.40 (2H, t, J=6.8Hz), 3.8-4.0 (9H, m), 6.64 (1H, d, J=9.0Hz), 6.85 (2H, d, J=9.1Hz), 6.96 (2H, d, J=9.1Hz), 8.05 (1H, dd, J=9.0 and 2.2Hz), 8.82 (1H, d, J=2.2Hz)

25 ⌈ APCI-MASS : m/z = 504 (M+H<sup>+</sup>)

CL Preparation 85

30 CL 4-[4-(7-Bromoheptyloxy)phenyl]bromobenzene

⌈ IR (KBr) : 2935.1, 2856.1, 1604.5 cm<sup>-1</sup>

⌈ NMR (CDCl<sub>3</sub>, δ) : 1.13-1.65 (6H, m), 1.70-2.02 (4H, m), 3.41 (2H, t, J=6.8Hz), 3.99 (2H, t, J=6.4Hz), 6.95 (2H, d, J=8.6Hz), 7.40 (2H, d, J=8.6Hz), 7.46 (2H, d, J=8.6Hz), 7.52 (2H, d, J=8.6Hz)

CL Preparation 86

CL 4-[4-(3-Bromooctyloxy)phenyl]bromobenzene

P NMR (CDCl<sub>3</sub>,  $\delta$ ) : 1.22-1.65 (8H, m), 1.65-1.95 (4H, m),  
3.41 (2H, t, J=6.8Hz), 3.99 (2H, t, J=6.4Hz), 6.95  
5 (2H, d, J=8.6Hz), 7.40 (2H, d, J=8.6Hz), 7.46 (2H,  
d, J=8.6Hz), 7.52 (2H, d, J=8.6Hz)

CL Preparation 87

CL Methyl (E)-3-[4-[4-(5-hexenyloxy)phenyl]phenyl]acrylate

10 P NMR (CDCl<sub>3</sub>,  $\delta$ ) : 1.50-1.72 (2H, m), 1.72-1.95 (2H, m),  
2.05-2.14 (2H, m), 3.82 (3H, s), 4.01 (2H, t;  
J=6.3Hz), 4.95-5.10 (2H, m), 5.70-5.93 (1H, m),  
6.46 (1H, d, J=16Hz), 6.97 (2H, d, J=8.7Hz), 7.54  
15 (2H, d, J=8.7Hz), 7.58 (4H, s), 7.72 (1H, d,  
J=16Hz)

P APCI-MASS : m/z = 337 (M<sup>+</sup>+1)

CL Preparation 88

CL 4-Bromo-4'-(4-methylpentyloxy)biphenyl

20 P IR (KBr) : 2956.3, 2871.5, 1606.4 cm<sup>-1</sup>

P NMR (CDCl<sub>3</sub>,  $\delta$ ) : 0.93 (6H, d, J=6.6Hz), 1.25-1.45 (2H,  
m), 1.62 (1H, sept, J=6.6Hz), 1.72-1.93 (2H, m),  
3.98 (2H, t, J=6.6Hz), 6.95 (2H, d, J=8.6Hz), 7.30-  
7.60 (6H, m)

25 P APCI-MASS : m/z = 332, 334 (M<sup>+</sup>, M<sup>+</sup>+2)

The following compounds (Preparations 89 to 90) were  
obtained according to a similar manner to that of Preparation  
2.

30 CL Preparation 89

CL N-[4-[2-(4-Methylpentyl)-2,3-dihydro-4H-1,2,4-triazol-3-  
one-4-yl]phenyl]piperazine ditrifluoroacetate

P IR (KBr) : 1668.1, 1519.6, 1203.4, 1176.4, 1130.1 cm<sup>-1</sup>

35 P NMR (DMSO-d<sub>6</sub>,  $\delta$ ) : 0.86 (6H, d, J=6.6Hz), 1.1-1.3 (2H,

80

m), 1.4-1.8 (3H, m), 3.1-3.3 (4H, m), 3.3-3.5 (4H, m), 3.70 (2H, t, J=7.0Hz), 7.11 (2H, d, J=9.0Hz), 7.53 (2H, d, J=9.0Hz), 8.35 (1H, s), 8.90 (2H, s)

5 CL Preparation 90

CL 1-(4-Phenylcyclohexyl)piperazine ditrifluoroacetate

P IR (KBr) : 1677.8, 1197.6, 1133.9  $\text{cm}^{-1}$

P NMR (DMSO- $\text{d}_6$ ,  $\delta$ ) : 1.4-1.8 (4H, m), 1.8-2.25 (4H, m), 2.4-2.7 (1H, m), 3.2-3.7 (9H, m), 4.54 (2H, br s), 7.0-7.4 (5H, m), 9.32 (1H, br s)

P APCI-MASS :  $m/z = 245$  ( $\text{M}^+ + \text{H}$ )

The following compounds (Preparations 91 to 103) were obtained according to a similar manner to that of Preparation

15 3.

CL Preparation 91

CL Methyl 6-[4-(4-octyloxyphenyl)piperazin-1-yl]nicotinate

P IR (KBr) : 2923, 1726, 1608, 1515, 1278, 1116  $\text{cm}^{-1}$

20 P NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 0.88 (3H, t, J=6.8Hz), 1.2-1.5 (10H, m), 1.7-1.8 (2H, m), 3.1-3.2 (4H, m), 3.8-4.0 (9H, m), 6.64 (1H, d, J=9.0Hz), 6.8-7.0 (4H, m), 8.04 (1H, dd, J=9.0 and 2.4Hz), 8.81 (1H, d, J=2.4Hz)

P APCI-MASS :  $m/z = 426$  ( $\text{M} + \text{H}^+$ )

25

CL Preparation 92

CL 4-[4-[4-[2-(4-Methylpentyl)-2,3-dihydro-4H-1,2,4-triazol-3-one-4-yl]phenyl]piperazin-1-yl]benzonitrile

P IR (KBr) : 2217.7, 1685.5  $\text{cm}^{-1}$

30 P NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 0.90 (6H, d, J=6.6Hz), 1.2-1.4 (2H, m), 1.5-2.0 (3H, m), 3.3-3.4 (4H, m), 3.4-3.6 (4H, m), 3.83 (2H, t, J=7.4Hz), 6.92 (2H, d, J=9.0Hz), 7.01 (2H, d, J=9.0Hz), 7.43 (2H, d, J=9.0Hz), 7.54 (2H, d, J=9.0Hz), 7.62 (1H, s)

35

CL Preparation 93

CL 3-Fluoro-4-[4-(4-methoxyphenyl)piperazin-1-yl]benzonitrile

- IR (KBr) : 2225.5, 1510.0, 1240.0  $\text{cm}^{-1}$   
5 NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 3.1-3.55 (8H, m), 3.79 (3H, s),  
6.7-7.1 (6H, m), 7.3-7.5 (1H, m)

CL Preparation 94

CL 3-Chloro-4-[4-(4-n-hexyloxyphenyl)piperazin-1-yl]benzonitrile

- 10 IR (KBr) : 2223.5, 1592.9, 1510.0, 1490.7, 1236.1  $\text{cm}^{-1}$   
NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 0.90 (3H, t,  $J=6.7\text{Hz}$ ), 1.3-1.6 (6H, m), 1.7-1.9 (2H, m), 3.2-3.4 (8H, m), 3.92 (2H, t,  $J=6.6\text{Hz}$ ), 6.85 (2H, d,  $J=9.3\text{Hz}$ ), 6.94 (2H, d,  $J=9.3\text{Hz}$ ), 7.08 (1H, d,  $J=8.4\text{Hz}$ ), 7.53 (1H, dd,  $J=8.4$  and  $1.9\text{Hz}$ ), 7.64 (1H, d,  $J=1.9\text{Hz}$ )  
15 APCI-MASS :  $m/z = 398$  ( $M^+ + H$ )

CL Preparation 95

20 CL Ethyl 3-[4-(4-n-hexyloxyphenyl)piperazin-1-yl]-6-pyridazinecarboxylate

- IR (KBr) : 1729.8, 1587.1, 1511.9, 1245.8  $\text{cm}^{-1}$   
NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 0.90 (3H, t,  $J=6.5\text{Hz}$ ), 1.2-1.4 (6H, m), 1.44 (3H, t,  $J=7.1\text{Hz}$ ), 1.65-1.85 (2H, m), 3.1-3.25 (4H, m), 3.8-4.0 (6H, m), 4.46 (2H, q,  $J=7.1\text{Hz}$ ), 6.8-7.0 (5H, m), 7.91 (1H, d,  $J=9.6\text{Hz}$ )  
25 APCI-MASS :  $m/z = 413$  ( $M^+ + H$ )

CL Preparation 96

CL 4-(4-Piperidinopiperidin-1-yl)benzonitrile

- 30 IR (KBr) : 2217.7, 1602.6, 1511.9  $\text{cm}^{-1}$   
NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 1.35-1.75 (8H, m), 1.92 (2H, d,  $J=12.9\text{Hz}$ ), 2.3-2.6 (5H, m), 2.86 (2H, td,  $J=12.8$  and  $2.6\text{Hz}$ ), 3.90 (2H, d,  $J=12.8\text{Hz}$ ), 6.84 (2H, d,  $J=9.1\text{Hz}$ ), 7.46 (2H, d,  $J=9.1\text{Hz}$ )  
35 APCI-MASS :  $m/z = 270$  ( $M^+ + H$ )

CL Preparation 97

CL 5-[4-(4-n-Hexyloxyphenyl)piperazin-1-yl]picolinonitrile

P IR (KBr) : 2223.5, 1575.6, 1511.9, 1241.9  $\text{cm}^{-1}$

P NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 0.90 (3H, t,  $J=6.5\text{Hz}$ ), 1.2-1.55 (6H, m), 1.7-1.85 (2H, m), 3.22 (4H, t,  $J=5.1\text{Hz}$ ), 3.52 (4H, t,  $J=5.1\text{Hz}$ ), 3.92 (2H, t,  $J=6.5\text{Hz}$ ), 6.86 (2H, d,  $J=9.4\text{Hz}$ ), 6.93 (2H, d,  $J=9.4\text{Hz}$ ), 7.13 (1H, dd,  $J=8.8$  and  $3.0\text{Hz}$ ), 7.53 (1H, d,  $J=8.8\text{Hz}$ ), 8.35 (1H, d,  $J=3.0\text{Hz}$ )

10 P APCI-MASS :  $m/z = 365$  ( $M^+ + H$ )

CL Preparation 98

CL 4-[4-(4-Cyclohexylphenyl)piperazin-1-yl]benzonitrile

P IR (KBr) : 2219.7, 1606.4, 1513.8, 1238.1  $\text{cm}^{-1}$

15 P NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 1.1-1.5 (6H, m), 1.65-2.0 (4H, m), 2.44 (1H, m), 3.30 (4H, t,  $J=5.1\text{Hz}$ ), 3.46 (4H, t,  $J=5.1\text{Hz}$ ), 6.90 (4H, d,  $J=8.9\text{Hz}$ ), 7.14 (2H, d,  $J=8.9\text{Hz}$ ), 7.52 (2H, d,  $J=8.9\text{Hz}$ )

P APCI-MASS :  $m/z = 346$  ( $M^+ + H$ )

20

CL Preparation 99

CL 4-[4-(4-n-Hexylphenyl)piperazin-1-yl]benzonitrile

P IR (KBr) : 2925.5, 2850.3, 2213.9, 1604.5, 1513.8, 1234.2, 944.9  $\text{cm}^{-1}$

25 P NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 0.88 (3H, t,  $J=6.4\text{Hz}$ ), 1.2-1.45 (6H, m), 1.45-1.7 (2H, m), 2.54 (2H, t,  $J=7.6\text{Hz}$ ), 3.2-3.4 (4H, m), 3.4-3.6 (4H, m), 6.89 (2H, d,  $J=8.5\text{Hz}$ ), 6.91 (2H, d,  $J=8.9\text{Hz}$ ), 7.11 (2H, d,  $J=8.5\text{Hz}$ ), 7.52 (2H, d,  $J=8.9\text{Hz}$ )

30

CL Preparation 100

CL 1-[2-(4-n-Hexylphenylamino)ethyl]-2-oxazolidone hydrochloride

P IR (KBr) : 2925.5, 2852.2, 1753.0, 1729.8, 1267.0  $\text{cm}^{-1}$

35 P NMR ( $\text{DMSO}-d_6$ ,  $\delta$ ) : 0.85 (3H, t,  $J=6.5\text{Hz}$ ), 1.1-1.4 (6H, m)

m), 1.45-1.7 (2H, m), 2.56 (2H, t, J=7.6Hz), 3.3-3.53 (4H, m), 3.57 (2H, t, J=7.9Hz), 4.24 (2H, t, J=7.9Hz), 7.24 (4H, s)

APCI-MASS :  $m/z = 291 (M^+ + H)$

5

CL

Preparation 101

CL

4-[4-(4-Phenylcyclohexyl)piperazin-1-yl]benzonitrile

IR (KBr) : 2212.0, 1602.6, 1513.8, 1249.6  $\text{cm}^{-1}$

NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 1.3-1.8 (4H, m), 1.9-2.2 (4H, m),

10

2.3-2.6 (2H, m), 2.75 (4H, t, J=5.0Hz), 3.34 (4H, t, J=5.0Hz), 6.86 (2H, d, J=8.9Hz), 7.1-7.4 (5H, m), 7.49 (2H, d, J=8.9Hz)

APCI-MASS :  $m/z = 346 (M^+ + H)$

15

CL

Preparation 102

CL

Methyl 6-[4-(4-hydroxyphenyl)piperazin-1-yl]nicotinate

IR (KBr) : 3411, 1691, 1602, 1510, 1432, 1249, 1147  $\text{cm}^{-1}$

NMR ( $\text{DMSO-d}_6$ ,  $\delta$ ) : 3.0-3.1 (4H, m), 3.7-3.9 (7H, m),

20

6.67 (2H, d, J=8.8Hz), 6.84 (2H, d, J=8.8Hz), 6.93 (1H, d, J=9.1Hz), 7.97 (1H, dd, J=2.4 and 9.1Hz), 8.66 (1H, d, J=2.4Hz), 8.88 (1H, s)

APCI-MASS :  $m/z = 314 (M + H)^+$

25

CL

Preparation 103

CL

1-n-Decylindole-5-carboxylic acid

IR (KBr) : 2921, 2854, 1679, 1612, 1427, 1313, 1199  $\text{cm}^{-1}$

NMR ( $\text{DMSO-d}_6$ ,  $\delta$ ) : 0.84 (3H, t, J=6.8Hz), 1.1-1.3

30

(14H, m), 1.6-1.8 (2H, m), 4.19 (2H, t, J=6.9Hz), 6.57 (1H, s), 7.4-7.8 (3H, m), 8.23 (1H, s), 12.40 (1H, s)

APCI-MASS :  $m/z = 302 (M + H^+)$

35

The following compounds (Preparations 104 to 111) were

obtained according to a similar manner to that of Preparation 10.

CL Preparation 104

5 CL (E)-Methyl 4-(4-n-butoxyphenyl)cinnamate

f IR (KBr) : 2958, 2939, 2873, 1720, 1637, 1498, 1313, 1195, 1170  $\text{cm}^{-1}$

f NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 0.98 (3H, t,  $J=7.3\text{Hz}$ ), 1.4-1.8 (4H, m), 3.81 (3H, s), 4.00 (2H, t,  $J=6.4\text{Hz}$ ), 6.45 (1H, d,  $J=16.0\text{Hz}$ ), 6.97 (2H, d,  $J=8.7\text{Hz}$ ), 7.5-7.7 (6H, m), 7.72 (1H, d,  $J=16.0\text{Hz}$ )

f APCI-MASS :  $m/z = 311$  ( $M+H^+$ )

CL Preparation 105

15 CL Methyl (E)-3-[4-[4-(4-methylpentylloxy)phenyl]phenyl]-acrylate

f IR (KBr) : 2956.3, 2873.4, 1720.2, 1635.3, 1600.6  $\text{cm}^{-1}$

f NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 0.93 (6H, d,  $J=6.5\text{Hz}$ ), 1.28-1.50 (2H, m), 1.50-1.95 (3H, m), 3.82 (3H, s), 3.99 (2H, t,  $J=6.6\text{Hz}$ ), 6.44 (1H, d,  $J=16.0\text{Hz}$ ), 6.97 (2H, d,  $J=8.7\text{Hz}$ ), 7.49-7.65 (6H, m), 7.71 (1H, d,  $J=16\text{Hz}$ )

f APCI-MASS :  $m/z = 339$  ( $M^++1$ )

CL Preparation 106

25 CL Methyl (E)-3-[4-[4-(6-fluorohexyloxy)phenyl]phenyl]-acrylate

f NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 1.23-2.00 (8H, m), 3.81 (3H, s), 4.01 (2H, t,  $J=6.4\text{Hz}$ ), 4.47 (2H, dt,  $J=47.4$  and  $6.0\text{Hz}$ ), 6.45 (1H, d,  $J=16.0\text{Hz}$ ), 6.96 (2H, d,  $J=8.8\text{Hz}$ ), 7.45-7.63 (6H, m), 7.72 (1H, d,  $J=16.0\text{Hz}$ )

f APCI-MASS :  $m/z = 357$  ( $M^++1$ )

CL Preparation 107

35 CL Methyl (E)-3-[4-[4-(6-methoxyhexyloxy)phenyl]phenyl]-



acrylate

P APCI-MASS :  $m/z = 369$  ( $M^+$ )

CL Preparation 108

5 CL Methyl (E)-3-[4-[4-(8-methoxyoctyloxy)phenyl]phenyl]-acrylate

P IR (KBr) : 2935.1, 2858.0, 1722.1, 1637.3, 1602.6  $\text{cm}^{-1}$

P NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 1.30-1.70 (10H, m), 1.70-1.92 (2H, m), 3.33 (3H, s), 3.37 (2H, t,  $J=6.5\text{Hz}$ ), 3.81 (3H, s), 4.00 (2H, t,  $J=6.5\text{Hz}$ ), 6.45 (1H, d,  $J=16.0\text{Hz}$ ), 6.97 (2H, d,  $J=8.8\text{Hz}$ ), 7.46-7.78 (6H, m), 7.72 (1H, d,  $J=16.0\text{Hz}$ )

P APCI-MASS :  $m/z = 397$  ( $M^++1$ )

15 CL Preparation 109

CL Methyl (E)-3-[4-(4-hydroxyphenyl)phenyl]acrylate

P IR (KBr) : 3409.5, 1695.1  $\text{cm}^{-1}$

P NMR ( $\text{DMSO}-d_6$ ,  $\delta$ ) : 3.73 (3H, s), 6.64 (1H, d,  $J=16\text{Hz}$ ), 6.85 (2H, d,  $J=8.6\text{Hz}$ ), 7.50-7.83 (5H, m)

20 P APCI-MASS :  $m/z = 255$  ( $M^++1$ )

CL Preparation 110

CL Methyl (E)-3-[4-[4-(7-methoxyheptyloxy)phenyl]phenyl]-acrylate

25 P NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 1.32-1.70 (8H, m), 1.70-1.92 (2H, m), 3.34 (3H, s), 3.38 (2H, t,  $J=6.4\text{Hz}$ ), 3.81 (3H, s), 4.00 (2H, t,  $J=6.5\text{Hz}$ ), 6.45 (1H, d,  $J=16.0\text{Hz}$ ), 6.97 (2H, d,  $J=8.8\text{Hz}$ ), 7.47-7.65 (6H, m), 7.70 (1H, d,  $J=16\text{Hz}$ )

30 P APCI-MASS :  $m/z = 383$  ( $M^++1$ )

CL Preparation 111

CL Methyl (E)-3-[4-[4-(7-fluoroheptyloxy)phenyl]phenyl]-acrylate

35 P IR (KBr) : 2937.1, 2861.8, 1722.1, 1637.3, 1600.6  $\text{cm}^{-1}$

The following compound was obtained according to a similar manner to that of Preparation 20.

CL Preparation 112

5 CL Methyl 3-[4-(4-heptylphenyl)phenyl]propanoate

P NMR (CDCl<sub>3</sub>,  $\delta$ ) : 0.88 (3H, t, J=6.5Hz), 1.15-1.50 (8H, m), 1.50-1.77 (2H, m), 2.52-2.73 (4H, m), 2.99 (2H, t, J=7.8Hz), 3.68 (3H, s), 7.18-7.35 (4H, m), 7.40-7.58 (4H, m)

10 P APCI-MASS : m/z = 339 (M<sup>+</sup>+1)

The following compounds (Preparation 113 to 164) were obtained according to a similar manner to that of Preparation 32.

15 CL Preparation 113

CL 4-(4-Octylphenyl)-2,4-dihydro-3H-1,2,4-triazol-3-one-2-yl-acetic acid

P IR (KBr) : 2923.6, 1704.8, 1224.6 cm<sup>-1</sup>

20 P NMR (DMSO-d<sub>6</sub>,  $\delta$ ) : 0.85 (3H, t, J=6.7Hz), 1.1-1.4 (10H, m), 1.4-1.7 (2H, m), 2.60 (2H, t, J=7.2Hz), 4.38 (2H, s), 7.32 (2H, d, J=8.5Hz), 7.58 (2H, d, J=8.5Hz), 8.43 (1H, s)

25 CL Preparation 114

CL 1-Heptyl-4-(4-carboxyphenyl)pyrazole

P IR (KBr) : 3106, 2917, 1687, 1612, 1425, 1295, 1184, 952, 860, 773 cm<sup>-1</sup>

30 P NMR (DMSO-d<sub>6</sub>,  $\delta$ ) : 0.85 (3H, t, J=6.8Hz), 1.1-1.4 (8H, m), 1.7-1.9 (2H, m), 4.11 (2H, t, J=7.0Hz), 7.69 (2H, d, J=8.5Hz), 7.91 (2H, d, J=8.5Hz), 7.98 (1H, s), 8.32 (1H, s), 12.82 (1H, br)

P APCI-MASS : m/z = 287 (M+H<sup>+</sup>)

35 CL Preparation 115

CL 6-[4-(4-Octyloxyphenyl)piperazin-1-yl]nicotinic acid

IR (KBr pelet) : 2919, 2854, 1697, 1608, 1515, 1429,  
1263, 1245, 1228  $\text{cm}^{-1}$

5 NMR (DMSO- $\text{d}_6$ ,  $\delta$ ) : 0.86 (3H, t,  $J=6.7\text{Hz}$ ), 1.1-1.5 (10H, m), 1.6-1.8 (2H, m), 3.0-3.2 (4H, m), 3.7-3.9 (4H, m), 3.88 (2H, t,  $J=6.4\text{Hz}$ ), 6.7-7.0 (5H, m), 7.95 (1H, dd,  $J=9.0$  and  $1.1\text{Hz}$ ), 8.64 (1H, d,  $J=1.1\text{Hz}$ )

APCI-MASS :  $m/z = 412$  ( $\text{M}+\text{H}^+$ )

10 CL Preparation 116

CL 2-(4-Hexyloxyphenyl)benzoxazole-5-carboxylic acid

IR (KBr) : 2952, 1689, 1677, 1619, 1500, 1415, 1299,  
1172, 1024  $\text{cm}^{-1}$

15 NMR (DMSO- $\text{d}_6$ ,  $\delta$ ) : 0.89 (3H, t,  $J=6.7\text{Hz}$ ), 1.2-1.5 (6H, m), 1.7-1.9 (2H, m), 4.09 (2H, t,  $J=6.5\text{Hz}$ ), 7.16 (2H, d,  $J=8.8\text{Hz}$ ), 7.84 (1H, d,  $J=8.5\text{Hz}$ ), 8.01 (1H, dd,  $J=8.5$  and  $1.5\text{Hz}$ ), 8.15 (2H, d,  $J=8.8\text{Hz}$ ), 8.26 (1H, d,  $J=1.5\text{Hz}$ )

APCI-MASS :  $m/z = 340$  ( $\text{M}+\text{H}^+$ )

20

CL Preparation 117

CL 4-[4-(4-n-Butyloxyphenyl)phenyl]benzoic acid

IR (KBr) : 2958, 2873, 1689, 1600, 1537, 1396  $\text{cm}^{-1}$

25 CL Preparation 118

CL 6-(4-Heptyloxyphenyl)nicotinic acid

IR (KBr) : 2858, 1699, 1674, 1589, 1425, 1180, 1016,  
781  $\text{cm}^{-1}$

30 NMR (DMSO- $\text{d}_6$ ,  $\delta$ ) : 0.87 (3H, t,  $J=6.7\text{Hz}$ ), 1.2-1.5 (8H, m), 1.6-1.8 (2H, m), 4.04 (2H, t,  $J=6.4\text{Hz}$ ), 7.06 (2H, d,  $J=8.9\text{Hz}$ ), 8.03 (1H, d,  $J=8.2\text{Hz}$ ), 8.13 (2H, d,  $J=8.9\text{Hz}$ ), 8.27 (1H, dd,  $J=8.2$  and  $2.2\text{Hz}$ ), 9.09 (1H, d,  $J=2.2\text{Hz}$ ), 13.31 (1H, br)

APCI-MASS :  $m/z = 314$  ( $\text{M}+\text{H}^+$ )

35

CL Preparation 119

CL 5-(4-Octyloxyphenyl)isoxazole-3-carboxylic acid

P IR (KBr pelet) : 2923, 2852, 1704, 1612, 1440, 1272,  
1178  $\text{cm}^{-1}$

5 P NMR ( $\text{DMSO-d}_6$ ,  $\delta$ ) : 0.86 (3H, t,  $J=6.8\text{Hz}$ ), 1.2-1.6  
(10H, m), 1.6-1.9 (2H, m), 4.03 (2H, t,  $J=6.5\text{Hz}$ ),  
7.08 (2H, d,  $J=8.9\text{Hz}$ ), 7.25 (1H, s), 7.86 (2H, d,  
 $J=8.9\text{Hz}$ )

P APCI-MASS :  $m/z = 318$  ( $\text{M}+\text{H}^+$ )

10

CL Preparation 120

CL 2-(2-Octyloxy-pyridin-5-yl)benzoxazole-5-carboxylic acid

P IR (KBr) : 2954, 2923, 2854, 1697, 1683, 1625, 1488,  
1290  $\text{cm}^{-1}$

15 P NMR ( $\text{DMSO-d}_6$ ,  $\delta$ ) : 0.86 (3H, t,  $J=7.6\text{Hz}$ ), 1.2-1.5  
(10H, m), 1.7-1.8 (2H, m), 4.36 (2H, t,  $J=6.6\text{Hz}$ ),  
7.04 (1H, d,  $J=8.7\text{Hz}$ ), 7.88 (1H, d,  $J=8.5\text{Hz}$ ), 8.04  
(1H, dd,  $J=8.5$  and  $1.6\text{Hz}$ ), 8.29 (1H, d,  $J=1.6\text{Hz}$ ),  
8.43 (1H, dd,  $J=8.7$  and  $2.4\text{Hz}$ ), 8.99 (1H, d,  
 $J=2.4\text{Hz}$ ), 13.0-13.2 (1H, br)

20

P APCI-MASS :  $m/z = 369$  ( $\text{M}+\text{H}^+$ )

CL Preparation 121

CL 2-[4-(4-Hexylphenyl)phenyl]benzoxazole-5-carboxylic acid

25 P IR (KBr) : 2923, 2854, 1683, 1411, 1299, 1054  $\text{cm}^{-1}$

P APCI-MASS :  $m/z = 400$  ( $\text{M}+\text{H}^+$ )

CL Preparation 122

CL 6-[4-(4-n-Butyloxyphenyl)phenyl]nicotinic acid

30 P IR (KBr) : 3406, 2958, 1691, 1591, 1394, 1284,  
1253  $\text{cm}^{-1}$

P NMR ( $\text{DMSO-d}_6$ ,  $\delta$ ) : 0.94 (3H, t,  $J=7.3\text{Hz}$ ), 1.4-1.8 (4H,  
m), 4.01 (2H, t,  $J=6.4\text{Hz}$ ), 7.02 (2H, d,  $J=8.7\text{Hz}$ ),  
7.57 (2H, d,  $J=8.7\text{Hz}$ ), 7.61 (2H, d,  $J=8.2\text{Hz}$ ), 7.83  
(2H, d,  $J=8.2\text{Hz}$ ), 8.05 (1H, d,  $J=8.5\text{Hz}$ ), 8.22 (1H,

35

dd,  $J=8.5$  and  $1.6\text{Hz}$ ),  $9.14$  ( $1\text{H}$ , d,  $J=1.6\text{Hz}$ )

⌘ APCI-MASS :  $m/z = 348$  ( $M+H^+$ )

CL Preparation 123

5 CL 4-[4-(5-Phenoxypropyloxy)phenyl]benzoic acid

⌘ NMR ( $\text{DMSO}-d_6$ ,  $\delta$ ) :  $1.5-1.7$  ( $2\text{H}$ , m),  $1.7-1.9$  ( $4\text{H}$ , m),  
 $3.98$  ( $2\text{H}$ , t,  $J=6.3\text{Hz}$ ),  $4.05$  ( $2\text{H}$ , t,  $J=6.1\text{Hz}$ ),  $6.8-$   
 $7.0$  ( $3\text{H}$ , m),  $7.05$  ( $2\text{H}$ , d,  $J=8.6\text{Hz}$ ),  $7.25$  ( $2\text{H}$ , t,  
 $J=8.2\text{Hz}$ ),  $7.68$  ( $2\text{H}$ , d,  $J=8.5\text{Hz}$ ),  $7.75$  ( $2\text{H}$ , d,  
10  $J=8.2\text{Hz}$ ),  $7.98$  ( $2\text{H}$ , d,  $J=8.2\text{Hz}$ ),  $12.8-13.0$  ( $1\text{H}$ , br  
s)

⌘ APCI-MASS :  $m/z = 375$  ( $M-H$ )<sup>-</sup>

CL Preparation 124

15 CL 4-[5-(4-n-Hexyloxyphenyl)-1,3,4-oxadiazol-2-yl]benzoic  
acid

⌘ IR (KBr) :  $2935$ ,  $2854$ ,  $1685$ ,  $1612$ ,  $1495$ ,  $1425$ ,  $1286$ ,  
 $1251\text{ cm}^{-1}$

⌘ NMR ( $\text{DMSO}-d_6$ ,  $\delta$ ) :  $0.89$  ( $3\text{H}$ , t,  $J=6.7\text{Hz}$ ),  $1.2-1.5$  ( $6\text{H}$ ,  
20 m),  $1.6-1.9$  ( $3\text{H}$ , m),  $4.12$  ( $2\text{H}$ , t,  $J=6.4\text{Hz}$ ),  $7.19$   
( $2\text{H}$ , d,  $J=8.7\text{Hz}$ ),  $8.08$  ( $2\text{H}$ , d,  $J=8.7\text{Hz}$ ),  $8.18$  ( $2\text{H}$ ,  
d,  $J=8.4\text{Hz}$ ),  $8.24$  ( $2\text{H}$ , d,  $J=8.4\text{Hz}$ )

⌘ APCI-MASS :  $m/z = 367$  ( $M+H$ )<sup>+</sup>

25 CL Preparation 125

CL 4-[5-(4-n-Hexyloxyphenyl)-1,3,4-thiadiazol-2-yl]benzoic  
acid

⌘ IR (KBr) :  $2952$ ,  $2586$ ,  $1699$ ,  $1604$ ,  $1517$ ,  $1432$ ,  $1251$ ,  
 $1174\text{ cm}^{-1}$

⌘ NMR ( $\text{DMSO}-d_6$ ,  $\delta$ ) :  $0.89$  ( $3\text{H}$ , t,  $J=6.7\text{Hz}$ ),  $1.3-1.9$  ( $8\text{H}$ ,  
30 m),  $4.04$  ( $2\text{H}$ , t,  $J=6.3\text{Hz}$ ),  $7.13$  ( $2\text{H}$ , d,  $J=8.8\text{Hz}$ ),  
 $7.97$  ( $2\text{H}$ , d,  $J=8.8\text{Hz}$ ),  $8.11$  ( $4\text{H}$ , s)

⌘ APCI-MASS :  $m/z = 383$  ( $M+H$ )<sup>+</sup>

35 CL Preparation 126

CL 5-(4-Octyloxyphenyl)-1-methylpyrazole-3-carboxylic acid

IR (KBr pelet) : 2950, 2923, 1695, 1450, 1282, 1251,  
956  $\text{cm}^{-1}$

5 NMR (DMSO- $d_6$ ,  $\delta$ ) : 0.86 (3H, t,  $J=6.8\text{Hz}$ ), 1.2-1.5  
(10H, m), 1.6-1.8 (2H, m), 3.98 (2H, t,  $J=6.5\text{Hz}$ ),  
4.10 (3H, s), 6.95 (1H, d,  $J=8.8\text{Hz}$ ), 7.18 (1H, s),  
7.73 (2H, d,  $J=8.8\text{Hz}$ ), 13.37 (1H, br)

APCI-MASS :  $m/z = 331$  ( $M+H^+$ )

10 CL Preparation 127

CL 4-[3-(4-n-Pentyloxyphenyl)pyrazol-5-yl]benzoic acid

IR (KBr) : 3224, 2956, 1692, 1614, 1506, 1251  $\text{cm}^{-1}$

15 NMR (DMSO- $d_6$ ,  $\delta$ ) : 0.91 (3H, t,  $J=6.9\text{Hz}$ ), 1.3-1.5 (4H,  
m), 1.6-1.8 (2H, m), 4.00 (2H, t,  $J=6.5\text{Hz}$ ), 7.02  
(2H, d,  $J=8.8\text{Hz}$ ), 7.19 (1H, s), 7.75 (2H, d,  
 $J=8.8\text{Hz}$ ), 7.95 (2H, d,  $J=8.7\text{Hz}$ ), 8.02 (2H, d,  
 $J=8.7\text{Hz}$ ), 12.8-13.3 (2H, br)

APCI-MASS :  $m/z = 351$  ( $M+H^+$ )

20 CL Preparation 128

CL 5-[4-(4-n-Butoxyphenyl)phenyl]furan-2-carboxylic acid

IR (KBr) : 2958, 2873, 1679, 1487, 1253, 1166  $\text{cm}^{-1}$

25 NMR (DMSO- $d_6$ ,  $\delta$ ) : 0.95 (3H, t,  $J=7.3\text{Hz}$ ), 1.3-1.8 (4H,  
m), 4.02 (2H, t,  $J=6.3\text{Hz}$ ), 7.03 (2H, d,  $J=8.6\text{Hz}$ ),  
7.17 (1H, d,  $J=3.6\text{Hz}$ ), 7.33 (1H, d,  $J=3.6\text{Hz}$ ), 7.66  
(2H, d,  $J=8.6\text{Hz}$ ), 7.74 (2H, d,  $J=8.4\text{Hz}$ ), 7.86 (2H,  
d,  $J=8.4\text{Hz}$ ), 13.1 (1H, br s)

APCI-MASS :  $m/z = 337$  ( $M+H^+$ )

30 CL Preparation 129

CL 3-(S)-Hydroxyhexadecanoic acid

IR (KBr) : 1679.7, 1467.6, 1224.6  $\text{cm}^{-1}$

35 NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 0.88 (3H, t,  $J=6.4\text{Hz}$ ), 1.1-1.7 (24H,  
m), 2.35-2.65 (2H, m), 4.03 (1H, m), 5.41 (1H, br  
s)

CL Preparation 130

CL 6-[4-(4-n-Hexyloxyphenyl)piperazin-1-yl]pyridazine-3-carboxylic acid

- P IR (KBr) : 1697.1, 1589.1, 1515.8, 1448.3  $\text{cm}^{-1}$   
5 P NMR (DMSO- $\text{d}_6$ ,  $\delta$ ) : 0.87 (3H, t,  $J=6.4\text{Hz}$ ), 1.2-1.5 (6H, m), 1.6-1.8 (2H, m), 3.0-3.2 (4H, m), 3.7-4.0 (6H, m), 6.83 (2H, d,  $J=9.0\text{Hz}$ ), 6.95 (2H, d,  $J=9.0\text{Hz}$ ), 7.36 (1H, d,  $J=9.6\text{Hz}$ ), 7.86 (1H, d,  $J=9.6\text{Hz}$ ), 11.68 (1H, s)

10 CL Preparation 131

CL 4-[4-[1-(4-n-Hexyloxyphenyl)piperidin-4-yl]piperazin-1-yl]benzoic acid hydrochloride

- P IR (KBr) : 1699.0, 1608.3, 1513.8  $\text{cm}^{-1}$   
15 P NMR (DMSO- $\text{d}_6$ ,  $\delta$ ) : 0.88 (3H, t,  $J=6.5\text{Hz}$ ), 1.2-1.5 (6H, m), 1.6-1.8 (2H, m), 2.0-2.45 (3H, m), 3.2-3.8 (12H, m), 3.94 (2H, t,  $J=6.4\text{Hz}$ ), 4.03 (2H, d,  $J=11\text{Hz}$ ), 6.95 (2H, d,  $J=8.7\text{Hz}$ ), 7.07 (2H, d,  $J=8.9\text{Hz}$ ), 7.32 (2H, br s), 7.83 (2H, d,  $J=8.9\text{Hz}$ )  
20 P APCI-MASS :  $m/z = 466 (M^+ + H)$

CL Preparation 132

CL 6-(8-Methoxyoctyloxy)-2-naphthoic acid

- P IR (KBr) : 2937.1, 2854.1, 1677.8, 1211.1  $\text{cm}^{-1}$   
25 P NMR (DMSO- $\text{d}_6$ ,  $\delta$ ) : 1.2-1.6 (10H, m), 1.7-1.9 (2H, m), 3.20 (3H, s), 3.29 (2H, t,  $J=6.5\text{Hz}$ ), 4.11 (2H, t,  $J=6.4\text{Hz}$ ), 7.23 (1H, dd,  $J=9.0$  and  $2.3\text{Hz}$ ), 7.39 (1H, d,  $J=2.3\text{Hz}$ ), 7.85 (1H, d,  $J=8.7\text{Hz}$ ), 7.93 (1H, d,  $J=8.7\text{Hz}$ ), 7.99 (1H, d,  $J=9.0\text{Hz}$ ), 8.51 (1H, s), 12.9 (1H, s)  
30

CL Preparation 133

CL Mixture of (E) and (Z)-3-[4-(4-Heptylphenyl)phenyl]-2-butenic acid

- 35 P NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 0.88 (3H, t,  $J=6.6\text{Hz}$ ), 1.15-1.50 (8H,

m), 1.52-1.75 (2H, m), 2.63 and 3.62 (total 3H, each s), 2.53-2.75 (2H, m), 6.24 and 5.68 (total 1H, each s), 7.19-7.35 (2H, m), 7.47-7.70 (6H, m)

APCI-MASS :  $m/z = 337 (M^++1)$ , 351 (methyl ester<sup>+</sup>+1)

5

CL

Preparation 134

CL

3-[4-(4-Heptylphenyl)phenyl]propanoic acid

P

NMR (CDCl<sub>3</sub>,  $\delta$ ) : 0.88 (3H, t,  $J=6.6\text{Hz}$ ), 1.13-1.48 (8H, m), 1.48-1.75 (2H, m), 2.52-2.83 (4H, m), 3.00 (2H, t,  $J=7.8\text{Hz}$ ), 7.15-7.35 (4H, m), 7.40-7.60 (4H, m)

10

APCI-MASS :  $m/z = 323 (M^+-1)$

CL

Preparation 135

CL

4-(4-n-Heptylphenyl)benzoyl-carboxylic acid

15

P

NMR (CDCl<sub>3</sub>,  $\delta$ ) : 0.88 (3H, t,  $J=6.6\text{Hz}$ ), 1.13-1.50 (8H, m), 1.50-1.75 (2H, m), 2.66 (2H, t,  $J=7.7\text{Hz}$ ), 7.20-7.40 (2H, m), 7.50-7.66 (2H, m), 7.66-7.84 (2H, m), 8.40-8.60 (2H, m)

APCI-MASS :  $m/z = 323 (M^+-1)$

20

CL

Preparation 136

CL

6-Hexylnaphthalene-2-carboxylic acid

P

NMR (CDCl<sub>3</sub>,  $\delta$ ) : 0.89 (3H, t,  $J=6.8\text{Hz}$ ), 1.15-1.53 (6H, m), 1.55-1.84 (2H, m), 2.80 (2H, t,  $J=7.6\text{Hz}$ ), 7.42 (1H, dd,  $J=1.7$  and  $8.4\text{Hz}$ ), 7.67 (1H, s), 7.84 (1H, d,  $J=8.6\text{Hz}$ ), 7.90 (1H, d,  $J=8.4\text{Hz}$ ), 8.09 (1H, dd,  $J=1.7$  and  $8.6\text{Hz}$ ), 8.68 (1H, s)

25

APCI-MASS :  $m/z = 257 (M^++1)$ , 271 (methyl ester<sup>+</sup>+1)

30

CL

Preparation 137

CL

3-(E)-[4-[4-(7-Methoxyheptyloxy)phenyl]phenyl]acrylic acid

P

NMR (DMSO-d<sub>6</sub>,  $\delta$ ) : 1.20-1.60 (8H, m), 1.60-1.83 (2H, m), 3.21 (3H, s), 3.25-3.60 (2H, m), 4.01 (2H, t,  $J=6.4\text{Hz}$ ), 6.54 (1H, d,  $J=16.0\text{Hz}$ ), 7.02 (2H, d,

35



J=8.8Hz), 7.55-7.80 (7H, m)

⌘ APCI-MASS : m/z = 369 (M<sup>+</sup>+1)

CL Preparation 138

5 CL 3-(E)-[4-[4-(8-Methoxyoctyloxy)phenyl]phenyl]acrylic acid

⌘ IR (KBr) : 3037.3, 2933.2, 2858.0, 2551.4, 1706.7, 1677.8, 1629.6, 1602.6 cm<sup>-1</sup>

10 ⌘ NMR (DMSO-d<sub>6</sub>, δ) : 1.18-1.55 (10H, m), 1.65-1.83 (2H, m), 3.18-3.45 (5H, m), 4.01 (2H, t, J=6.5Hz), 6.53 (1H, d, J=16.0Hz), 7.02 (2H, d, J=8.8Hz), 7.50-8.80 (7H, m)

⌘ APCI-MASS : m/z = 383 (M<sup>+</sup>+1)

15 CL Preparation 139

CL 3-(E)-[4-[4-(5-Hexenyloxy)phenyl]phenyl]acrylic acid

20 ⌘ NMR (DMSO-d<sub>6</sub>, δ) : 1.42-1.63 (2H, m), 1.63-1.85 (2H, m), 2.00-2.20 (2H, m), 4.03 (2H, t, J=6.3Hz), 4.90-5.15 (2H, m), 5.68-5.97 (1H, m), 6.54 (1H, d, J=16Hz), 7.02 (2H, d, J=8.7Hz), 7.50-7.80 (7H, m)

⌘ APCI-MASS : m/z = 323 (M<sup>+</sup>+1)

CL Preparation 140

25 CL 3-(E)-[4-[4-(4-Methylpentyloxy)phenyl]phenyl]acrylic acid

⌘ IR (KBr) : 2956.3, 2869.6, 2713.4, 2599.6, 1689.3, 1627.6, 1602.6 cm<sup>-1</sup>

30 ⌘ NMR (DMSO-d<sub>6</sub>, δ) : 0.89 (6H, d, J=6.5Hz), 1.15-1.43 (2H, m), 1.48-1.90 (3H, m), 4.00 (2H, t, J=6.7Hz), 6.54 (1H, d, J=16Hz), 7.02 (2H, d, J=8.7Hz), 7.50-7.90 (7H, m)

⌘ APCI-MASS : m/z = 325 (M<sup>+</sup>+1)

CL Preparation 141

35 CL 3-(E)-[4-[4-(6-Fluorohexyloxy)phenyl]phenyl]acrylic acid

- 1 NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 1.39-2.00 (8H, m), 4.01 (2H, t,  $J=6.5\text{Hz}$ ), 4.47 (2H, dt,  $J=47.3$  and  $6.0\text{Hz}$ ), 6.49 (1H, d,  $J=15.9\text{Hz}$ ), 6.98 (2H, d,  $J=8.7\text{Hz}$ ), 7.40-7.70 (6H, m), 7.81 (1H, d,  $J=15.9\text{Hz}$ )
- 5 APCI-MASS :  $m/z = 343$  ( $M^++1$ )

CL Preparation 142

CL 3-(E)-[4-[4-(6-Methoxyhexyloxy)phenyl]phenyl]acrylic acid

- 10 NMR ( $\text{DMSO}-d_6$ ,  $\delta$ ) : 1.22-1.63 (6H, m), 1.63-1.88 (2H, m), 3.21 (3H, s), 3.22-3.40 (2H, m), 4.00 (2H, t,  $J=6.5\text{Hz}$ ), 6.54 (1H, d,  $J=15.8\text{Hz}$ ), 7.02 (2H, d,  $J=8.7\text{Hz}$ ), 7.50-7.84 (7H, m)
- APCI-MASS :  $m/z = 369$  (methyl ester,  $M^++1$ )

15 CL Preparation 143

CL 4-[4-[8-(Tetrahydropyran-2-yl-oxy)octyloxy]phenyl]benzoic acid

- IR (KBr) : 2935, 1697, 1683, 1604, 1303, 1290, 1197  $\text{cm}^{-1}$
- 20 NMR ( $\text{DMSO}-d_6$ ,  $\delta$ ) : 1.2-1.8 (18H, m), 3.3-3.9 (4H, m), 4.01 (2H, t,  $J=6.3\text{Hz}$ ), 4.5-4.6 (1H, m), 7.03 (2H, d,  $J=8.7\text{Hz}$ ), 7.67 (2H, d,  $J=8.7\text{Hz}$ ), 7.74 (2H, d,  $J=8.3\text{Hz}$ ), 7.98 (2H, d,  $J=8.3\text{Hz}$ )
- 25 APCI-MASS :  $m/z = 425$  ( $M-H^+$ )

CL Preparation 144

CL 4-[3-(4-n-Hexyloxyphenyl)pyrazol-5-yl]benzoic acid

- IR (KBr) : 2956, 2935, 1693, 1614, 1508, 1432, 1251, 1178  $\text{cm}^{-1}$
- 30 NMR ( $\text{DMSO}-d_6$ ,  $\delta$ ) : 0.89 (3H, t,  $J=6.4\text{Hz}$ ), 1.2-1.5 (6H, m), 1.6-1.8 (2H, m), 4.00 (2H, t,  $J=6.4\text{Hz}$ ), 7.02 (2H, d,  $J=8.7\text{Hz}$ ), 7.12 (1H, s), 7.74 (2H, d,  $J=8.7\text{Hz}$ ), 7.95 (2H, d,  $J=8.8\text{Hz}$ ), 8.01 (2H, d,  $J=8.8\text{Hz}$ ), 13.17 (1H, s)
- 35

APCI-MASS :  $m/z = 365$  ( $M+H^+$ )

Preparation 145

4-[4-[4-(6-Methoxyhexyloxy)phenyl]phenyl]benzoic acid

IR (KBr) : 2939, 2861, 1685, 1602, 1430, 1286,  
1128  $\text{cm}^{-1}$

NMR ( $\text{DMSO}-d_6$ ,  $\delta$ ) : 1.3-1.8 (8H, m), 3.21 (3H, s),  
3.3-3.4 (2H, m), 4.01 (2H, t,  $J=6.5\text{Hz}$ ), 7.04 (2H,  
d,  $J=8.6\text{Hz}$ ), 7.66 (2H, d,  $J=8.6\text{Hz}$ ), 7.7-7.9 (6H,  
m), 8.03 (2H, d,  $J=8.2\text{Hz}$ )

APCI-MASS :  $m/z = 405$  ( $M+H^+$ )

Preparation 146

4-[5-[4-(8-Methoxyoctyloxy)phenyl]-1,3,4-thiadiazol-2-yl]benzoic acid

IR (KBr) : 2931, 2854, 1691, 1602, 1251  $\text{cm}^{-1}$

NMR ( $\text{DMSO}-d_6$ ,  $\delta$ ) : 1.2-2.0 (12H, m), 3.20 (3H, s),  
3.29 (2H, t,  $J=6.4\text{Hz}$ ), 4.04 (2H, t,  $J=6.4\text{Hz}$ ), 7.13  
(2H, t,  $J=8.8\text{Hz}$ ), 7.9-8.2 (6H, m), 13.95 (1H, br)

APCI-MASS :  $m/z = 441$  ( $M+H^+$ )

Preparation 147

4-(4-n-Butoxyphenyl)cinnamic acid

IR (KBr) : 2958, 2871, 1695, 1625, 1498, 1249  $\text{cm}^{-1}$

NMR ( $\text{DMSO}-d_6$ ,  $\delta$ ) : 0.94 (3H, t,  $J=7.3\text{Hz}$ ), 1.44 (2H,  
tq,  $J=7.0$  and  $7.3\text{Hz}$ ), 1.71 (2H, tt,  $J=7.0$  and  
 $6.4\text{Hz}$ ), 4.01 (2H, t,  $J=6.4\text{Hz}$ ), 6.54 (1H, d,  
 $J=16.0\text{Hz}$ ), 7.02 (2H, d,  $J=8.7\text{Hz}$ ), 7.6-7.9 (7H, m)

APCI-MASS :  $m/z = 297$  ( $M+H^+$ )

Preparation 148

4-[5-(4-Cyclohexylphenyl)-1,3,4-thiadiazol-2-yl]benzoic acid

IR (KBr) : 2925, 2850, 1683, 1429, 1292  $\text{cm}^{-1}$

NMR ( $\text{DMSO}-d_6$ ,  $\delta$ ) : 1.1-1.5 (5H, m), 1.6-2.0 (5H, m),

2.4-2.6 (1H, m), 7.45 (2H, d, J=8.3Hz), 7.96 (2H, d, J=8.3Hz), 8.13 (4H, s)

⌘ APCI-MASS : m/z = 365 (M+H)<sup>+</sup>

5 CL Preparation 149

CL 4-[5-[4-(Piperidin-1-yl)phenyl]-1,3,4-thiadiazol-2-yl]-benzoic acid

⌘ IR (KBr) : 2931, 2854, 1685, 1604, 1415, 1238 cm<sup>-1</sup>

⌘ NMR (DMSO-d<sub>6</sub>, δ) : 1.61 (6H, s), 3.31 (4H, s), 7.05 (2H, d, J=9.0Hz), 7.83 (2H, d, J=9.0Hz), 8.10 (4H, s)

⌘ APCI-MASS : m/z = 366 (M+H)<sup>+</sup>

CL Preparation 150

15 CL 4-[5-[4-[4-n-Propyloxyphenyl]phenyl]-1,3,4-oxadiazol-2-yl]benzoic acid

⌘ IR (KBr) : 2939, 1689, 1606, 1488, 1429, 1290 cm<sup>-1</sup>

⌘ NMR (DMSO-d<sub>6</sub>, δ) : 1.00 (3H, t, J=7.3Hz), 1.76 (2H, tq, J=6.5 and 7.3Hz), 4.00 (2H, t, J=6.5Hz), 7.07 (2H, d, J=8.8Hz), 7.70 (2H, d, J=8.5Hz), 7.78 (2H, d, J=8.8Hz), 7.90 (2H, d, J=8.5Hz), 8.0-8.4 (4H, m)

⌘ APCI-MASS : m/z = 401 (M+H)<sup>+</sup>

CL Preparation 151

25 CL 4-(5-n-Nonyl-1,3,4-oxadiazol-2-yl)benzoic acid

⌘ IR (KBr) : 2919, 2852, 1685, 1565, 1430, 1284 cm<sup>-1</sup>

⌘ NMR (DMSO-d<sub>6</sub>, δ) : 0.84 (3H, t, J=6.5Hz), 1.2-1.5 (12H, m), 1.7-1.9 (2H, m), 2.94 (2H, t, J=7.4Hz), 8.0-8.2 (4H, m), 13.35 (1H, s)

30 ⌘ APCI-MASS : m/z = 317 (M+H)<sup>+</sup>

CL Preparation 152

CL 4-[3-(4-n-Hexyloxyphenyl)-1,2,4-oxadiazol-5-yl]benzoic acid

35 ⌘ IR (KBr) : 2942, 2869, 1695, 1421, 1251 cm<sup>-1</sup>

1 NMR (DMSO- $d_6$ ,  $\delta$ ) : 0.89 (3H, t,  $J=6.8\text{Hz}$ ), 1.2-1.8 (8H, m), 4.06 (2H, t,  $J=6.5\text{Hz}$ ), 7.13 (2H, d,  $J=8.9\text{Hz}$ ), 8.03 (2H, d,  $J=8.9\text{Hz}$ ), 8.17 (2H, d,  $J=8.5\text{Hz}$ ), 8.28 (2H, d,  $J=8.5\text{Hz}$ )

5 APCI-MASS :  $m/z = 367 (M+H)^+$

CL Preparation 153

CL 4-[4-[4-(5-Methoxypentyloxy)phenyl]phenyl]phenylacetic acid

10 IR (KBr) : 2939, 2861, 1699, 1253, 1182, 1124  $\text{cm}^{-1}$

1 NMR (DMSO- $d_6$ ,  $\delta$ ) : 1.4-1.9 (6H, m), 3.22 (3H, s), 3.39 (2H, t,  $J=6.2\text{Hz}$ ), 3.61 (2H, s), 4.01 (2H, t,  $J=6.4\text{Hz}$ ), 7.02 (2H, d,  $J=8.8\text{Hz}$ ), 7.35 (2H, d,  $J=8.2\text{Hz}$ ), 7.6-7.8 (8H, m)

15 APCI-MASS :  $m/z = 405 (M+H)^+$

CL Preparation 154

CL 4-[5-(4-n-Octyloxyphenyl)-1,3,4-thiadiazol-2-yl]benzoic acid

20 IR (KBr) : 2921, 2856, 1691, 1432, 1251  $\text{cm}^{-1}$

1 NMR (DMSO- $d_6$ ,  $\delta$ ) : 0.87 (3H, t,  $J=6.7\text{Hz}$ ), 1.2-1.5 (10H, m), 1.7-1.9 (2H, m), 4.07 (2H, t,  $J=6.5\text{Hz}$ ), 7.13 (2H, d,  $J=8.9\text{Hz}$ ), 7.97 (2H, d,  $J=8.9\text{Hz}$ ), 8.12 (4H, s)

25 APCI-MASS :  $m/z = 411 (M+H)^+$

CL Preparation 155

CL 4-[5-(4-Trans-n-pentylcyclohexyl)-1,3,4-thiadiazol-2-yl]benzoic acid

30 IR (KBr) : 2919, 2848, 1677, 1430, 1294  $\text{cm}^{-1}$

1 NMR (DMSO- $d_6$ ,  $\delta$ ) : 0.87 (3H, t,  $J=6.9\text{Hz}$ ), 1.0-1.4 (11H, m), 1.5-1.6 (2H, m), 1.8-2.0 (2H, m), 2.1-2.3 (2H, m), 3.1-3.3 (1H, m), 8.07 (4H, s)

1 APCI-MASS :  $m/z = 359 (M+H)^+$

CL Preparation 156

CL 4-[3-(4-n-Pentyloxyphenyl)isoxazol-5-yl]benzoic acid  
P IR (KBr) : 2925, 2869, 1699, 1687, 1612, 1432, 1251,  
1178  $\text{cm}^{-1}$

5 P NMR ( $\text{DMSO-d}_6$ ,  $\delta$ ) : 0.91 (3H, t,  $J=6.9\text{Hz}$ ), 1.2-1.5 (4H, m), 1.7-1.9 (2H, m), 4.04 (2H, t,  $J=6.5\text{Hz}$ ), 7.09 (2H, d,  $J=8.8\text{Hz}$ ), 7.69 (1H, s), 7.85 (2H, d,  $J=8.8\text{Hz}$ ), 8.01 (2H, d,  $J=8.5\text{Hz}$ ), 8.11 (2H, d,  $J=8.5\text{Hz}$ )

10 P APCI-MASS :  $m/z = 352$  ( $\text{M}+\text{H}^+$ )

CL Preparation 157

CL 4-[5-[4-(8-Methoxyoctyloxy)phenyl]-1,3,4-oxadiazol-2-yl]benzoic acid

15 P IR (KBr) : 2967, 2937, 2877, 1687, 1290  $\text{cm}^{-1}$

P NMR ( $\text{DMSO-d}_6$ ,  $\delta$ ) : 1.2-1.6 (10H, m), 1.7-1.9 (2H, m), 3.20 (3H, s), 3.29 (2H, t,  $J=6.4\text{Hz}$ ), 4.08 (2H, t,  $J=6.5\text{Hz}$ ), 7.17 (2H, d,  $J=8.9\text{Hz}$ ), 8.07 (2H, d,  $J=8.9\text{Hz}$ ), 8.15 (2H, d,  $J=8.6\text{Hz}$ ), 8.24 (2H, d,  $J=8.6\text{Hz}$ )

20 P APCI-MASS :  $m/z = 425$  ( $\text{M}+\text{H}^+$ )

CL Preparation 158

CL 4-[4-(6-Phenylpyridazin-3-yl-oxy)phenyl]benzoic acid

25 P IR (KBr) : 1700, 1687, 1608, 1427, 1284, 1186  $\text{cm}^{-1}$

P NMR ( $\text{DMSO-d}_6$ ,  $\delta$ ) : 7.40 (2H, d,  $J=8.6\text{Hz}$ ), 7.5-7.7 (4H, m), 7.7-7.9 (4H, m), 7.9-8.1 (4H, m), 8.35 (1H, d,  $J=9.2\text{Hz}$ ), 12.99 (1H, br s)

P APCI-MASS :  $m/z = 369$  ( $\text{M}+\text{H}^+$ )

30

CL Preparation 159

CL 4-[5-(4-n-Octyloxyphenyl)-1,3,4-oxadiazol-2-yl]benzoic acid

35 P IR (KBr) : 2921, 2852, 1685, 1612, 1496, 1425, 1288, 1251  $\text{cm}^{-1}$

1 NMR (DMSO- $d_6$ ,  $\delta$ ) : 0.87 (3H, t,  $J=6.7\text{Hz}$ ), 1.2-1.5 (10H, m), 1.7-1.9 (2H, m), 4.08 (2H, t,  $J=6.4\text{Hz}$ ), 7.17 (2H, d,  $J=8.7\text{Hz}$ ), 8.07 (2H, d,  $J=8.7\text{Hz}$ ), 8.15 (2H, d,  $J=8.5\text{Hz}$ ), 8.24 (2H, d,  $J=8.5\text{Hz}$ ), 13.36 (1H, br)

1 APCI-MASS :  $m/z = 395$  ( $M+H^+$ )

CL Preparation 160

CL 4-[2-(4-n-Hexyloxyphenyl)pyrimidin-6-yl]benzoic acid

10 IR (KBr) : 2944, 2863, 1697, 1585, 1415, 1386, 1253  $\text{cm}^{-1}$

15 NMR (DMSO- $d_6$ ,  $\delta$ ) : 0.89 (3H, t,  $J=6.7\text{Hz}$ ), 1.2-1.6 (6H, m), 1.7-1.9 (2H, m), 4.07 (2H, t,  $J=6.6\text{Hz}$ ), 7.10 (2H, d,  $J=8.9\text{Hz}$ ), 8.00 (1H, d,  $J=5.2\text{Hz}$ ), 8.13 (2H, d,  $J=8.4\text{Hz}$ ), 8.44 (2H, d,  $J=5.9\text{Hz}$ ), 8.47 (2H, d,  $J=5.9\text{Hz}$ ), 8.95 (1H, d,  $J=5.2\text{Hz}$ )

1 APCI-MASS :  $m/z = 377$  ( $M+H^+$ )

CL Preparation 161

20 CL 4-[4-(7-Piperidinocarbonylheptyloxy)phenyl]benzoic acid

IR (KBr) : 2933, 2858, 1697, 1677, 1637, 1604, 1429, 1249  $\text{cm}^{-1}$

25 NMR (DMSO- $d_6$ ,  $\delta$ ) : 1.2-1.8 (16H, m), 2.26 (2H, t,  $J=7.5\text{Hz}$ ), 3.2-3.5 (4H, m), 4.01 (2H, t,  $J=6.4\text{Hz}$ ), 7.03 (2H, d,  $J=8.8\text{Hz}$ ), 7.67 (2H, d,  $J=8.8\text{Hz}$ ), 7.74 (2H, d,  $J=8.4\text{Hz}$ ), 7.98 (2H, d,  $J=8.4\text{Hz}$ )

1 APCI-MASS :  $m/z = 424$  ( $M+H^+$ )

CL Preparation 162

30 CL 6-[4-(4-n-Heptyloxyphenyl)piperazin-1-yl]nicotinic acid

IR (KBr) : 2929, 2854, 1695, 1673, 1606, 1577, 1515, 1421, 1245  $\text{cm}^{-1}$

35 NMR (DMSO- $d_6$ ,  $\delta$ ) : 0.86 (3H, t,  $J=6.7\text{Hz}$ ), 1.2-1.5 (8H, m), 1.6-1.8 (2H, m), 3.0-3.2 (4H, m), 3.6-3.8 (4H, m), 3.87 (2H, t,  $J=6.5\text{Hz}$ ), 6.8-7.2 (5H, m), 7.95

(1H, dd, J=8.9 and 2.3Hz), 8.62 (1H, d, J=2.3Hz)

⌘ APCI-MASS : m/z = 398 (M+H<sup>+</sup>)

CL Preparation 163

5 CL 6-[4-[4-(8-Methoxyoctyloxy)phenyl]piperazin-1-yl]-  
nicotinic acid

⌘ IR (KBr) : 2933, 2956, 1697, 1672, 1605, 1511, 1421,  
1245 cm<sup>-1</sup>

10 ⌘ NMR (DMSO-d<sub>6</sub>, δ) : 1.2-1.8 (12H, m), 3.08 (4H, t,  
J=5.0Hz), 3.20 (3H, s), 3.28 (2H, t, J=6.5Hz), 3.78  
(4H, t, J=4.6Hz), 3.87 (2H, t, J=6.4Hz), 6.8-7.0  
(5H, m), 7.95 (1H, dd, J=9.0 and 2.2Hz), 8.65 (1H,  
d, J=2.2Hz), 12.54 (1H, s)

⌘ APCI-MASS : m/z = 442 (M+H<sup>+</sup>)

15 CL Preparation 164

CL 4-[5-[4-(4-n-Propyloxyphenyl)phenyl]-1,3,4-thiadiazol-2-  
yl]benzoic acid

⌘ IR (KBr) : 1685, 1537, 1423, 817 cm<sup>-1</sup>

20 ⌘ NMR (DMSO-d<sub>6</sub>, δ) : 1.00 (3H, t, J=6.7Hz), 1.6-1.8 (2H,  
m), 4.00 (2H, t, J=6.6Hz), 7.0-7.2 (2H, d,  
J=8.6Hz), 7.6-8.1 (10H, m)

⌘ APCI-MASS : m/z = 417 (M+H)<sup>+</sup>

25 CL Preparation 165

To a solution of Ethyl 4-[5-(4-n-pentyloxyphenyl)-  
isoxazol-3-yl]benzoate (6.33 g) in ethanol (60 ml) and  
tetrahydrofuran (90 ml) was added 2N sodium hydroxide aqueous  
solution (12.5 ml) at 80°C. The mixture was refluxed for 1  
30 hour and poured into ice-water. The suspension was adjusted  
to pH 2.0 with 1N HCl. The precipitate was collected by  
filtration, washed with water and dried to give 4-[5-(4-n-  
pentyloxyphenyl)isoxazol-3-yl]benzoic acid (5.80 g).

35 ⌘ IR (KBr) : 2939, 2867, 1681, 1614, 1429, 1255, 1178,  
821 cm<sup>-1</sup>



1 NMR (DMSO-d<sub>6</sub>,  $\delta$ ) : 0.91 (3H, t, J=7.1Hz), 1.3-1.5 (4H, m), 1.6-1.8 (2H, m), 4.04 (2H, t, J=6.5Hz), 7.11 (2H, d, J=8.9Hz), 7.54 (1H, s), 7.85 (2H, d, J=8.9Hz), 7.98 (2H, d, J=8.6Hz), 8.11 (2H, d, J=8.6Hz)

5 APCI-MASS : m/z = 352 (M+H)<sup>+</sup>

The following compounds (Preparations 166 to 170) were obtained according to a similar manner to that of Preparation 40.

10 Preparation 166

5-[4-(4-n-Hexyloxyphenyl)piperazin-1-yl]picolic acid trihydrochloride

15 IR (KBr) : 1689.3, 1577.5, 1511.9, 1241.9 cm<sup>-1</sup>  
NMR (DMSO-d<sub>6</sub>,  $\delta$ ) : 0.88 (3H, t, J=6.5Hz), 1.15-1.5 (6H, m), 1.6-1.8 (2H, m), 3.1-3.25 (4H, m), 3.45-3.6 (4H, m), 3.89 (2H, t, J=6.4Hz), 6.84 (2H, d, J=9.1Hz), 6.97 (2H, d, J=9.1Hz), 7.43 (1H, dd, J=8.8 and 3.0Hz), 7.90 (1H, dd, J=8.8 and 0.7Hz), 8.41 (1H, dd, J=3.0 and 0.7Hz)

20 APCI-MASS : m/z = 384 (M<sup>+</sup>+H)

Preparation 167

25 4-[4-(4-Phenylcyclohexyl)piperazin-1-yl]benzoic acid dihydrochloride

IR (KBr) : 1700.9, 1606.4, 1220.7, 1180.2 cm<sup>-1</sup>  
NMR (DMSO-d<sub>6</sub>,  $\delta$ ) : 1.4-1.85 (4H, m), 1.9-2.05 (2H, m), 2.2-2.4 (2H, m), 3.1-3.5 (6H, m), 3.5-3.7 (2H, m), 3.9-4.2 (2H, m), 7.06 (2H, d, J=8.8Hz), 7.1-7.4 (5H, m), 7.83 (2H, d, J=8.8Hz)

30 APCI-MASS : m/z = 365 (M<sup>+</sup>+H)

Preparation 168

35 4-(4-Trans-n-pentylcyclohexyl)benzoic acid

- IR (KBr) : 1681.6, 1423.2, 1290.1  $\text{cm}^{-1}$   
NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 0.90 (3H, t,  $J=6.6\text{Hz}$ ), 1.0-1.6 (13H, m), 1.89 (4H, d,  $J=10\text{Hz}$ ), 2.54 (1H, t,  $J=12\text{Hz}$ ), 7.30 (2H, d,  $J=8.3\text{Hz}$ ), 8.03 (2H, d,  $J=8.3\text{Hz}$ )  
5 APCI-MASS :  $m/z = 274$  ( $\text{M}^+ + \text{H}$ )

CL Preparation 169

- CL 4-(4-Piperidinopiperidin-1-yl)benzoic acid  
IR (KBr) : 1710.6, 1403.9  $\text{cm}^{-1}$   
10 NMR ( $\text{DMSO}-d_6$ ,  $\delta$ ) : 1.6-2.1 (8H, m), 2.17 (2H, d,  $J=12\text{Hz}$ ), 2.7-3.05 (4H, m), 3.2-3.5 (1H, m), 3.35 (2H, d,  $J=12\text{Hz}$ ), 4.05 (2H, d,  $J=13\text{Hz}$ ), 7.01 (2H, d,  $J=8.9\text{Hz}$ ), 7.77 (2H, d,  $J=8.9\text{Hz}$ ), 10.84 (1H, s)  
APCI-MASS :  $m/z = 289$  ( $\text{M}^+ + \text{H}$ )

15

CL Preparation 170

- CL 3-Chloro-4-[4-(4-n-hexyloxyphenyl)piperazin-1-yl]benzoic acid dihydrochloride  
IR (KBr) : 1712.5, 1598.7, 1513.8, 1251.6  $\text{cm}^{-1}$   
20 NMR ( $\text{DMSO}-d_6$ ,  $\delta$ ) : 0.88 (3H, t,  $J=6.6\text{Hz}$ ), 1.2-1.5 (6H, m), 1.6-1.8 (2H, m), 3.4-3.6 (8H, m), 3.98 (2H, t,  $J=6.4\text{Hz}$ ), 7.02 (2H, d,  $J=9.0\text{Hz}$ ), 7.32 (1H, d,  $J=8.1\text{Hz}$ ), 7.60 (2H, d,  $J=9.0\text{Hz}$ ), 7.89 (1H, d,  $J=8.1\text{Hz}$ ), 8.02 (1H, s)  
25 APCI-MASS :  $m/z = 417$  ( $\text{M}^+ + \text{H}$ )

The following compounds (Preparations 171 to 175) were obtained according to a similar manner to that of Preparation 41.

30

CL Preparation 171

- CL Ethyl [4-(4-octylphenyl)-2,3-dihydro-4H-1,2,4-triazole-3-one-2-yl]acetate  
35 IR (KBr) : 2921.6, 1764.5, 1715, 1197.6  $\text{cm}^{-1}$

5  $\delta$  NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 0.88 (3H, t,  $J=6.7\text{Hz}$ ), 1.30 (3H, t,  $J=7.1\text{Hz}$ ), 1.2-1.4 (10H, m), 1.5-1.7 (2H, m), 2.63 (2H, t,  $J=7.9\text{Hz}$ ), 4.26 (2H, q,  $J=7.1\text{Hz}$ ), 4.64 (2H, s), 7.28 (2H, d,  $J=8.4\text{Hz}$ ), 7.44 (2H, d,  $J=8.4\text{Hz}$ ), 7.71 (1H, s)

CL

Preparation 172

CL 4-[4-(4-tert-Butoxycarbonylpiperazin-1-yl)phenyl]-2-(4-methylpentyl)-2,3-dihydro-4H-1,2,4-triazol-3-one

10  $\delta$  IR (KBr) :  $1687.4\text{ cm}^{-1}$   
 $\delta$  NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 0.90 (6H, d,  $J=6.5\text{Hz}$ ), 1.1-1.4 (2H, m), 1.49 (9H, s), 1.4-1.9 (3H, m), 3.16 (4H, t,  $J=4.9\text{Hz}$ ), 3.59 (4H, t,  $J=4.9\text{Hz}$ ), 3.82 (2H, t,  $J=7.3\text{Hz}$ ), 6.98 (2H, d,  $J=9.0\text{Hz}$ ), 7.41 (2H, d,  $J=9.0\text{Hz}$ ), 7.61 (1H, s)

CL

Preparation 173

CL Methyl 6-(8-bromooctyloxy)-2-naphthoate

20  $\delta$  IR (KBr) : 2933.2, 2856.1, 1720.2, 1294,  $1209.1\text{ cm}^{-1}$   
 $\delta$  NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 1.3-1.6 (8H, m), 1.75-2.0 (4H, m), 3.42 (2H, t,  $J=6.8\text{Hz}$ ), 3.96 (3H, s), 4.09 (2H, t,  $J=6.5\text{Hz}$ ), 7.14 (1H, d,  $J=1.7\text{Hz}$ ), 7.19 (1H, dd,  $J=8.9$  and  $1.7\text{Hz}$ ), 7.73 (1H, d,  $J=8.7\text{Hz}$ ), 7.83 (1H, d,  $J=8.9\text{Hz}$ ), 8.01 (1H, dd,  $J=8.7$  and  $1.7\text{Hz}$ ), 8.51 (1H, d,  $J=1.7\text{Hz}$ )  
 $\delta$  APCI-MASS :  $m/z = 393\text{ (M}^+\text{+H)}$

CL

Preparation 174

CL 4-[4-(6-n-Propyloxyhexyloxy)phenyl]benzoic acid

30  $\delta$  IR (KBr) : 2937, 2858, 1695, 1683, 1604, 1430, 1290, 1247,  $1195\text{ cm}^{-1}$   
 $\delta$  NMR ( $\text{DMSO-d}_6$ ,  $\delta$ ) : 0.85 (3H, t,  $J=7.4\text{Hz}$ ), 1.3-1.9 (10H, m), 3.2-3.4 (4H, m), 4.01 (2H, t,  $J=6.3\text{Hz}$ ), 7.04 (2H, d,  $J=8.7\text{Hz}$ ), 7.67 (2H, d,  $J=8.7\text{Hz}$ ), 7.74 (2H, d,  $J=8.3\text{Hz}$ ), 7.98 (2H, d,  $J=8.3\text{Hz}$ ), 12.9 (1H,

s)

APCI-MASS :  $m/z = 357 (M+H^+)$

CL

Preparation 175

5 CL 4-[4-(6-Bromohexyloxy)phenyl]bromobenzene

P NMR ( $CDCl_3$ ,  $\delta$ ) : 1.40-1.65 (4H, m), 1.70-2.00 (4H, m),  
3.43 (2H, t,  $J=6.7Hz$ ), 4.00 (2H, t,  $J=6.4Hz$ ), 6.95  
(2H, d,  $J=8.8Hz$ ), 7.30-7.60 (6H, m)

10 The following compounds (Preparations 176 to 180) were  
obtained according to a similar manner to that of Preparation  
43.

CL

Preparation 176

15 CL 4-[4-(4-n-Pentyloxyphenyl)piperazin-1-yl]benzoic acid  
dihydrochloride

P IR (KBr) : 1668.1, 1602.6, 1510.0, 1228.4  $cm^{-1}$

P NMR ( $DMSO-d_6$ ,  $\delta$ ) : 0.89 (3H, t,  $J=6.9Hz$ ), 1.2-1.5 (5H,  
m), 1.6-1.9 (2H, m), 3.0-3.2 (4H, m), 3.4-3.6 (4H,  
20 m), 3.88 (2H, t,  $J=6.4Hz$ ), 6.83 (2H, d,  $J=9Hz$ ),  
6.9-7.1 (4H, m), 7.79 (2H, d,  $J=8.8Hz$ ), 12.32 (1H,

s)

P APCI-MASS :  $m/z = 369 (M+H^+)$

25 CL

Preparation 177

CL 4-[4-(4-n-Heptyloxyphenyl)piperazin-1-yl]benzoic acid  
dihydrochloride

P IR (KBr) : 1666.2, 1600.6, 1511.9  $cm^{-1}$

P NMR ( $CDCl_3$ ,  $\delta$ ) : 0.89 (3H, t,  $J=6.9Hz$ ), 1.2-2.0 (10H,  
30 m), 3.1-3.3 (4H, m), 3.4-3.6 (4H, m), 3.92 (2H, t,  
 $J=6.4Hz$ ), 6.8-7.1 (6H, m), 8.00 (2H, d,  $J=8.8Hz$ )

CL

Preparation 178

35 CL 4-[4-[4-(4-Methylpentyloxy)phenyl]piperazin-1-yl]benzoic

acid dihydrochloride

IR (KBr) : 1668.1, 1602.6, 1510.0, 1236.1  $\text{cm}^{-1}$

NMR (DMSO- $d_6$ ,  $\delta$ ) : 0.89 (6H, d,  $J=6.5\text{Hz}$ ), 1.2-1.4 (2H, m), 1.4-1.8 (3H, m), 3.0-3.2 (4H, m), 3.3-3.5 (4H, m), 3.87 (2H, t,  $J=6.3\text{Hz}$ ), 6.83 (2H, d,  $J=9.0\text{Hz}$ ), 6.9-7.1 (4H, m), 7.79 (2H, d,  $J=8.8\text{Hz}$ ), 12.33 (1H, s)

APCI-MASS :  $m/z = 383$  ( $M+H^+$ )

10 Preparation 179

4-[4-[4-(8-Bromooctyloxy)phenyl]piperazin-1-yl]benzoic acid dihydrochloride

IR (KBr) : 1670.1, 1602.6, 1511.9, 1234.2  $\text{cm}^{-1}$

NMR (DMSO- $d_6$ ,  $\delta$ ) : 1.2-1.5 (8H, m), 1.6-1.9 (4H, m), 3.0-3.2 (4H, m), 3.2-3.5 (4H, m), 3.52 (2H, t,  $J=6.7\text{Hz}$ ), 3.88 (2H, t,  $J=6.4\text{Hz}$ ), 6.83 (2H, d,  $J=9.1\text{Hz}$ ), 6.94 (2H, d,  $J=9.1\text{Hz}$ ), 7.02 (2H, d,  $J=8.9\text{Hz}$ ), 7.79 (2H, d,  $J=8.9\text{Hz}$ )

20 Preparation 180

3-Fluoro-4-[4-(4-n-hexyloxyphenyl)piperazin-1-yl]benzoic acid dihydrochloride

IR (KBr) : 1673.9, 1511.9, 1240.0  $\text{cm}^{-1}$

NMR (DMSO- $d_6$ ,  $\delta$ ) : 0.88 (3H, t,  $J=6.5\text{Hz}$ ), 1.2-1.5 (6H, m), 1.6-1.8 (2H, m), 3.0-3.5 (8H, m), 3.88 (2H, t,  $J=6.4\text{Hz}$ ), 6.7-7.2 (5H, m), 7.4-7.8 (2H, m), 12.82 (1H, s)

APCI-MASS :  $m/z = 401$  ( $M^++H$ )

30 The following compound was obtained according to a similar manner to that of Preparation 46.

Preparation 181

1-(4-Methoxycarbonylphenyl)-3-(4-n-hexyloxyphenyl)-propan-1,3-dione

IR (KBr) : 2956, 2927, 2856, 1722, 1511, 1284,  
1108  $\text{cm}^{-1}$

NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 0.92 (3H, t,  $J=6.4\text{Hz}$ ), 1.2-2.0 (8H, m), 3.96 (3H, s), 4.04 (2H, t,  $J=6.5\text{Hz}$ ), 6.82 (1H, s), 6.97 (2H, d,  $J=8.7\text{Hz}$ ), 7.9-8.1 (4H, m), 8.14 (2H, d,  $J=8.3\text{Hz}$ )

APCI-MASS :  $m/z = 383$  ( $M+H^+$ )

The following compounds (Preparations 182 to 185) were obtained according to a similar manner to that of Preparation 47.

Preparation 182

Methyl 5-(4-octyloxyphenyl)-1-methylpyrazole-3-carboxylate

IR (KBr pelet) : 2923, 1724, 1616, 1513, 1446, 1251, 1120  $\text{cm}^{-1}$

NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 0.89 (3H, t,  $J=6.8\text{Hz}$ ), 1.2-1.5 (10H, m), 1.7-1.9 (2H, m), 3.90 (3H, s), 3.98 (2H, t,  $J=6.6\text{Hz}$ ), 4.20 (3H, s), 6.92 (2H, d,  $J=8.9\text{Hz}$ ), 7.04 (1H, s), 7.89 (2H, d,  $J=8.9\text{Hz}$ )

APCI-MASS :  $m/z = 345$  ( $M+H^+$ )

Preparation 183

Methyl 4-[5-(4-n-pentyloxyphenyl)pyrazol-3-yl]benzoate

IR (KBr) : 3236, 2952, 2873, 1716, 1616, 1508, 1276, 1174, 1106  $\text{cm}^{-1}$

NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 0.94 (3H, t,  $J=7.0\text{Hz}$ ), 1.3-1.5 (4H, m), 1.7-1.9 (2H, m), 3.92 (3H, s), 3.96 (2H, t,  $J=6.7\text{Hz}$ ), 6.78 (1H, s), 6.88 (2H, d,  $J=8.7\text{Hz}$ ), 7.55 (2H, d,  $J=8.7\text{Hz}$ ), 7.79 (2H, d,  $J=8.4\text{Hz}$ ), 8.02 (2H, d,  $J=8.4\text{Hz}$ )

APCI-MASS :  $m/z = 365$  ( $M+H^+$ )

Preparation 184

CL Methyl 5-(4-octyloxyphenyl)isoxazole-3-carboxylate

IR (KBr pelet) : 2950, 2921, 1724, 1614, 1510, 1446,  
1257, 1178, 1143, 1009  $\text{cm}^{-1}$

5 NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 0.89 (3H, t,  $J=6.8\text{Hz}$ ), 1.2-1.6 (10H, m), 1.7-1.9 (2H, m), 4.0-4.1 (5H, m), 6.80 (1H, s), 6.98 (2H, dd,  $J=6.9$  and  $2.1\text{Hz}$ ), 7.73 (2H, dd,  $J=6.9$  and  $2.1\text{Hz}$ )

APCI-MASS :  $m/z = 332$  ( $M+H^+$ )

10 CL Preparation 185

CL Methyl 4-[3-(4-n-hexyloxyphenyl)pyrazol-5-yl]benzoate

IR (KBr) : 2952, 1716, 1616, 1508, 1276, 1106  $\text{cm}^{-1}$

15 NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 0.91 (3H, t,  $J=6.3\text{Hz}$ ), 1.2-1.6 (6H, m), 1.7-1.9 (2H, m), 3.8-4.0 (5H, m), 6.76 (1H, s), 6.86 (2H, d,  $J=8.8\text{Hz}$ ), 7.54 (2H, d,  $J=8.8\text{Hz}$ ), 7.77 (2H, d,  $J=8.4\text{Hz}$ ), 8.00 (2H, d,  $J=8.4\text{Hz}$ )

APCI-MASS :  $m/z = 379$  ( $M+H^+$ )

CL Preparation 186

20 A suspension of 1-(4-n-Pentyloxyphenyl)-3-(4-ethoxycarbonylphenyl)-1-buten-3-one (74.43 g) and hydroxyamine hydrochloride (28.23 g) and potassium carbonate (56.11 g) in ethanol (400 ml) was refluxed for 4 hours. The mixture was diluted with ethyl acetate, washed with water  
25 (x 2), brine and dried over magnesium sulfate. The solvents were removed under reduced pressure to give crude oxime. To a solution of crude oxime in dichloroethane (500 ml) was added activated-manganese(IV) oxide (200 g). The reaction mixture was refluxed for 2 hours and filtered. The residue  
30 was washed with dichloromethane. The solvents were removed under reduced pressure and the residue was triturated with acetonitrile. The solid was collected by filtration and dried to give ethyl 4-[5-(4-n-Pentyloxyphenyl)isoxazol-3-yl]benzoate (21.07 g).

35 IR (KBr) : 2945, 2872, 1717, 1615, 1508, 1280,

1108  $\text{cm}^{-1}$

5  $\delta$  NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 0.95 (3H, t,  $J=6.9\text{Hz}$ ), 1.3-1.9 (9H, m), 4.01 (2H, t,  $J=6.5\text{Hz}$ ), 4.41 (2H, q,  $J=7.1\text{Hz}$ ), 6.74 (1H, s), 6.99 (2H, d,  $J=8.8\text{Hz}$ ), 7.76 (2H, d,  $J=8.8\text{Hz}$ ), 7.93 (2H, d,  $J=8.4\text{Hz}$ ), 8.15 (2H, d,  $J=8.4\text{Hz}$ )

$\delta$  APCI-MASS :  $m/z = 380$  ( $M+H^+$ )

The following compounds (Preparations 187 to 190) were obtained according to a similar manner to that of Preparation 48.

cl Preparation 187

15 cl Methyl 6-[4-[4-(8-Methoxyoctyloxy)phenyl]piperazin-1-yl]nicotinate

$\delta$  IR (KBr) : 2933, 2858, 1722, 1608, 1513, 1432, 1405, 1278, 1245  $\text{cm}^{-1}$

20  $\delta$  NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 1.3-1.9 (12H, m), 3.16 (4H, t,  $J=5.0\text{Hz}$ ), 3.33 (3H, s), 3.36 (2H, t,  $J=6.5\text{Hz}$ ), 3.8-4.0 (9H, m), 6.64 (1H, d,  $J=9.1\text{Hz}$ ), 6.85 (2H, d,  $J=9.2\text{Hz}$ ), 6.93 (2H, d,  $J=9.2\text{Hz}$ ), 8.04 (1H, dd,  $J=9.1$  and  $2.2\text{Hz}$ ), 8.81 (1H, d,  $J=2.2\text{Hz}$ )

$\delta$  APCI-MASS :  $m/z = 456$  ( $M+H^+$ )

25 cl Preparation 188

cl 4-[4-(5-Methoxypentyloxy)phenyl]bromobenzene

$\delta$  IR (KBr) : 2940, 2856, 1604, 1479, 1286, 1255, 1124  $\text{cm}^{-1}$

30  $\delta$  NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 1.5-1.9 (6H, m), 3.34 (3H, s), 3.41 (2H, t,  $J=6.1\text{Hz}$ ), 3.99 (2H, t,  $J=6.4\text{Hz}$ ), 6.95 (2H, d,  $J=8.7\text{Hz}$ ), 7.4-7.6 (6H, m)

$\delta$  APCI-MASS :  $m/z = 349$  ( $M+H^+$ )

cl Preparation 189

35 cl Methyl 6-(8-methoxyoctyloxy)-2-naphthoate



$\delta$  NMR (DMSO- $d_6$ ,  $\delta$ ) : 1.2-1.6 (10H, m), 1.7-1.9 (2H, m),  
 3.20 (3H, s), 3.29 (2H, t,  $J=6.4\text{Hz}$ ), 3.89 (3H, s),  
 4.11 (2H, t,  $J=6.4\text{Hz}$ ), 7.24 (1H, dd,  $J=9.0$  and  
 2.4Hz), 7.40 (1H, d,  $J=2.4\text{Hz}$ ), 7.88 (1H, d,  
 5  $J=8.7\text{Hz}$ ), 7.94 (1H, dd,  $J=8.7$  and  $1.5\text{Hz}$ ), 8.03 (1H,  
 d,  $J=9.0\text{Hz}$ ), 8.55 (1H, d,  $J=1.5\text{Hz}$ )

CL Preparation 190

CL 4-[4-[4-(8-Methoxyoctyloxy)phenyl]piperazin-1-yl]benzoic  
 10 acid dihydrochloride

$\delta$  IR (KBr) : 1668.1, 1602.6, 1511.9, 1236.1  $\text{cm}^{-1}$

$\delta$  NMR (DMSO- $d_6$ ,  $\delta$ ) : 1.2-1.8 (12H, m), 3.05-3.2 (4H, m),  
 3.29 (2H, t,  $J=7.1\text{Hz}$ ), 3.33 (3H, s), 3.4-3.55 (4H,  
 m), 3.88 (2H, t,  $J=6.4\text{Hz}$ ), 6.82 (2H, d,  $J=9.0\text{Hz}$ ),  
 15 6.94 (2H, d,  $J=9.0\text{Hz}$ ), 7.02 (2H, d,  $J=8.8\text{Hz}$ ), 7.79  
 (2H, d,  $J=8.8\text{Hz}$ ), 12.31 (1H, s)

The following compounds (Preparations 191 to 254) were  
 obtained according to a similar manner to that of Preparation  
 20 49.

CL Preparation 191

CL 1-[4-[4-[4-[2-(4-Methylpentyl)-2,3-dihydro-4H-1,2,4-  
 triazol-3-one-4-yl]phenyl]piperazin-1-yl]benzoyl]-  
 25 benzotriazole 3-oxide

$\delta$  IR (KBr) : 1766.5, 1693.2, 1600.6, 1519.6  $\text{cm}^{-1}$

CL Preparation 192

CL 1-[4-(4-Octylphenyl)-2,3-dihydro-4H-1,2,4-triazol-3-one-  
 30 2-yl-acetyl]benzotriazole 3-oxide

$\delta$  IR (KBr) : 2921.6, 1753.0, 1720.0, 1423.2  $\text{cm}^{-1}$

$\delta$  NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 0.88 (3H, t,  $J=6.7\text{Hz}$ ), 1.2-1.4 (10H,  
 m), 1.5-1.8 (2H, m), 2.65 (2H, t,  $J=7.5\text{Hz}$ ), 5.46  
 (2H, s), 7.30 (2H, d,  $J=8.5\text{Hz}$ ), 7.48 (2H, d,  
 35  $J=8.5\text{Hz}$ ), 7.62 (1H, t,  $J=8.3\text{Hz}$ ), 7.80 (1H, s), 7.82

(1H, t,  $J=8.3\text{Hz}$ ), 8.05 (1H, d,  $J=8.3\text{Hz}$ ), 8.37 (1H, d,  $J=8.3\text{Hz}$ )

CL Preparation 193

5 CL 1-[4-[4-[4-(7-Methoxyheptyloxy)phenyl]piperazin-1-yl]benzoyl]benzotriazole 3-oxide

P IR (KBr) : 1783.8, 1600.6, 1511.9, 1232.3, 1184.1  $\text{cm}^{-1}$

P NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 1.3-1.9 (10H, m), 3.2-3.3 (4H, m),  
10 3.34 (3H, s), 3.38 (2H, t,  $J=6.4\text{Hz}$ ), 3.5-3.7 (4H, m), 3.92 (2H, t,  $J=6.5\text{Hz}$ ), 6.87 (2H, d,  $J=9.2\text{Hz}$ ), 6.95 (2H, d,  $J=9.2\text{Hz}$ ), 7.00 (2H, d,  $J=9.0\text{Hz}$ ), 7.3-7.6 (3H, m), 8.09 (1H, d,  $J=8.2\text{Hz}$ ), 8.15 (2H, d,  $J=9.0\text{Hz}$ )

15 CL Preparation 194

CL 1-[4-[4-(4-n-Heptyloxyphenyl)piperazin-1-yl]benzoyl]benzotriazole 3-oxide

P IR (KBr) : 1783.8, 1600.6, 1511.9, 1230.4, 1184.1  $\text{cm}^{-1}$

P NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 0.90 (3H, t,  $J=6.3\text{Hz}$ ), 1.2-1.6 (8H, m), 1.7-1.9 (2H, m), 3.2-3.3 (4H, m), 3.5-3.7 (4H, m), 3.93 (2H, t,  $J=6.5\text{Hz}$ ), 6.87 (2H, d,  $J=9.2\text{Hz}$ ), 6.95 (2H, d,  $J=9.2\text{Hz}$ ), 7.00 (2H, d,  $J=9.0\text{Hz}$ ), 7.3-7.7 (3H, m), 8.09 (1H, d,  $J=8.2\text{Hz}$ ), 8.15 (2H, d,  $J=9.0\text{Hz}$ )

25 CL Preparation 195

CL 1-[4-[4-[4-(4-Methylpentylloxy)phenyl]piperazin-1-yl]benzoyl]benzotriazole 3-oxide

P NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 0.92 (6H, d,  $J=6.6\text{Hz}$ ), 1.2-1.4 (2H, m), 1.5-1.9 (3H, m), 3.1-3.3 (4H, m), 3.5-3.7 (4H, m), 3.92 (2H, t,  $J=6.6\text{Hz}$ ), 6.87 (2H, d,  $J=9.3\text{Hz}$ ), 6.96 (2H, d,  $J=9.3\text{Hz}$ ), 7.01 (2H, d,  $J=9.0\text{Hz}$ ), 7.4-7.6 (3H, m), 8.10 (1H, d,  $J=8.2\text{Hz}$ ), 8.15 (2H, d,  $J=9.0\text{Hz}$ )

CL Preparation 196

CL 1-[4-[4-(4-n-Pentyloxyphenyl)piperazin-1-yl]benzoyl]benzotriazole 3-oxide

5 P IR (KBr) : 1787.7, 1600.6, 1511.9, 1232.3, 1184.1  $\text{cm}^{-1}$   
P NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 0.93 (3H, t,  $J=6.9\text{Hz}$ ), 1.3-1.6 (4H, m), 1.7-1.9 (2H, m), 3.1-3.4 (4H, m), 3.5-3.8 (4H, m), 3.93 (2H, t,  $J=6.6\text{Hz}$ ), 6.87 (2H, d,  $J=9.2\text{Hz}$ ), 6.92 (2H, d,  $J=9.2\text{Hz}$ ), 7.01 (2H, d,  $J=9.1\text{Hz}$ ), 7.4-7.6 (3H, m), 8.10 (1H, d,  $J=8.2\text{Hz}$ ), 8.15 (2H, d,  $J=9.1\text{Hz}$ )

CL Preparation 197

CL 1-[4-[4-[8-(1H-Tetrazol-1-yl)octyloxy]phenyl]benzoyl]benzotriazole 3-oxide

15

and

CL 1-[4-[4-[8-(2H-tetrazol-2-yl)octyloxy]phenyl]benzoyl]benzotriazole 3-oxide

20 P IR (KBr) : 1778.0, 1602.6, 1189.9, 981.6  $\text{cm}^{-1}$   
P NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 1.2-1.6 (8H, m), 1.7-1.9 (2H, m), 1.9-2.2 (2H, m), 4.02 (2H, t,  $J=6.4\text{Hz}$ ), 4.44 and 4.66 (2H, t,  $J=7.1\text{Hz}$ ), 7.02 (2H, d,  $J=8.8\text{Hz}$ ), 7.4-7.6 (3H, m), 7.63 (2H, d,  $J=8.8\text{Hz}$ ), 7.79 (2H, d,  $J=8.6\text{Hz}$ ), 8.12 (1H, d,  $J=8.2\text{Hz}$ ), 8.32 (2H, d,  $J=8.6\text{Hz}$ ), 8.51 and 8.60 (1H, s)

25

CL Preparation 198

CL 1-[4-[4-[8-(2,6-Dimethylmorpholin-4-yl)octyloxy]phenyl]benzoyl]benzotriazole 3-oxide

30 P IR (KBr) : 1778.0, 1600.6, 977.7  $\text{cm}^{-1}$   
P NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 1.18 (6H, d,  $J=6.3\text{Hz}$ ), 1.2-1.7 (10H, m), 1.7-2.0 (4H, m), 2.4-2.6 (2H, m), 2.9-3.2 (2H, m), 3.7-3.9 (2H, m), 4.01 (2H, t,  $J=6.5\text{Hz}$ ), 7.02 (2H, d,  $J=8.8\text{Hz}$ ), 7.4-7.7 (3H, m), 7.63 (2H, d,

35

J=8.8Hz), 7.79 (2H, d, J=8.5Hz), 8.12 (1H, d, J=8.1Hz), 8.32 (2H, d, J=8.5Hz)

CL Preparation 199

5 CL 1-[6-[4-(4-Octyloxyphenyl)piperazin-1-yl]nicotinoyl]-benzotriazole 3-oxide

IR (KBr pelet) : 2922, 2854, 1766, 1602, 1513, 1417, 1234, 1025, 950, 813  $\text{cm}^{-1}$

10 NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 0.89 (3H, t, J=6.8Hz), 1.2-1.5 (10H, m), 1.7-1.9 (2H, m), 3.1-3.3 (4H, m), 3.9-4.1 (6H, m), 6.75 (1H, d, J=9.2Hz), 6.87 (2H, d, J=9.2Hz), 6.95 (2H, d, J=9.2Hz), 7.4-7.6 (3H, m), 8.10 (1H, d, J=8.1Hz), 8.19 (1H, dd, J=9.2 and 2.4Hz), 9.04 (1H, d, J=2.4Hz)

15 APCI-MASS :  $m/z = 529$  ( $M+H^+$ )

CL Preparation 200

CL 1-[2-(4-Hexyloxyphenyl)benzoxazol-5-yl-carbonyl]-benzotriazole 3-oxide

20 IR (KBr) : 2950, 1774, 1623, 1504, 1265, 1176  $\text{cm}^{-1}$

NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 0.93 (3H, t, J=6.9Hz), 1.3-1.6 (6H, m), 1.8-2.0 (2H, m), 4.07 (2H, t, J=6.5Hz), 7.06 (2H, d, J=8.9Hz), 7.4-7.6 (3H, m), 7.75 (1H, d, J=8.6Hz), 8.13 (1H, d, J=8.2Hz), 8.2-8.4 (3H, m), 8.67 (1H, d, J=1.6Hz)

25 APCI-MASS :  $m/z = 457$  ( $M+H^+$ )

CL Preparation 201

CL 1-[4-[4-(4-n-Butyloxyphenyl)phenyl]benzoyl]-benzotriazole 3-oxide

30 IR (KBr) : 2958, 2871, 1776, 1600, 1398, 1255, 1211, 1037  $\text{cm}^{-1}$

35 NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 1.00 (3H, t, J=7.2Hz), 1.4-1.9 (4H, m), 4.03 (2H, t, J=6.4Hz), 7.01 (2H, d, J=8.3Hz), 7.4-7.8 (9H, m), 7.87 (2H, d, J=8.1Hz), 8.12 (1H,

d, J=8.4Hz), 8.36 (2H, d, J=7.9Hz)

⌘ APCI-MASS : m/z = 464 (M+H)<sup>+</sup>

CL Preparation 202

5 CL 1-[2-(4-Heptyloxyphenyl)pyridin-5-yl-carbonyl]benzotriazole 3-oxide

⌘ IR (KBr) : 2944, 2867, 1793, 1770, 1589, 1471, 1321, 1093 cm<sup>-1</sup>

10 ⌘ NMR (CDCl<sub>3</sub>, δ) : 0.91 (3H, t, J=6.7Hz), 1.2-1.6 (8H, m), 1.7-1.9 (2H, m), 4.05 (2H, t, J=6.5Hz), 7.04 (2H, d, J=8.0Hz), 7.4-7.6 (3H, m), 7.91 (1H, d, J=8.5Hz), 8.1-8.2 (3H, m), 8.51 (1H, dd, J=8.5 and 2.3Hz), 9.47 (1H, d, J=2.3Hz)

⌘ APCI-MASS : m/z = 431 (M+H)<sup>+</sup>

15

CL Preparation 203

CL 1-[2-(2-Octyloxyppyridin-5-yl)benzoxazol-5-yl-carbonyl]benzotriazole 3-oxide

⌘ IR (KBr pelet) : 2925, 2854, 1787, 1623, 1479, 1263, 989 cm<sup>-1</sup>

20

⌘ NMR (CDCl<sub>3</sub>, δ) : 0.89 (3H, t, J=6.8Hz), 1.2-1.5 (10H, m), 1.8-1.9 (2H, m), 4.42 (2H, t, J=6.7Hz), 6.91 (1H, d, J=8.7Hz), 6.4-6.6 (3H, m), 7.79 (1H, d, J=8.6Hz), 8.13 (1H, d, J=8.2Hz), 8.32 (1H, dd, J=8.6 and 1.7Hz), 8.41 (1H, dd, J=8.7 and 2.4Hz), 8.70 (1H, d, J=1.4Hz), 9.07 (1H, d, J=1.9Hz)

25

⌘ APCI-MASS : m/z = 486 (M+H)<sup>+</sup>

CL Preparation 204

30 CL 1-[2-[4-(4-Hexylphenyl)phenyl]benzoxazol-5-yl-carbonyl]benzotriazole 3-oxide

⌘ IR (KBr) : 2927, 2854, 1785, 1621, 1490, 1261, 1166, 1052 cm<sup>-1</sup>

⌘ NMR (CDCl<sub>3</sub>, δ) : 0.90 (3H, t, J=6.5Hz), 1.2-1.8 (8H, m), 2.68 (2H, t, J=7.9Hz), 7.31 (2H, d, J=8.2Hz),

35

7.4-7.7 (5H, m), 7.79-7.81 (3H, m), 8.13 (1H, d, J=8.3Hz), 8.3-8.4 (3H, m), 8.73 (1H, d, J=1.3Hz)

APCI-MASS :  $m/z = 517 (M+H^+)$

5 Preparation 205

1-[2-[4-(4-n-Butyloxyphenyl)phenyl]pyridin-5-yl-carbonyl]benzotriazole 3-oxide

IR (KBr) : 2956, 2933, 2871, 1774, 1650, 1591, 1471, 1251  $\text{cm}^{-1}$

10 NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 1.00 (3H, t, J=7.2Hz), 1.5-1.9 (4H, m), 4.03 (2H, t, J=6.4Hz), 7.02 (2H, d, J=8.6Hz), 7.4-7.6 (3H, m), 7.54 (2H, d, J=7.3Hz), 7.62 (2H, d, J=8.5Hz), 8.02 (1H, d, J=8.3Hz), 8.13 (1H, d, J=8.2Hz), 8.21 (2H, d, J=7.9Hz), 8.57 (1H, dd, J=8.3 and 2.0Hz), 9.54 (1H, d, J=2.0Hz)

APCI-MASS :  $m/z = 465 (M+H)^+$

20 Preparation 206

1-[4-[4-(5-Phenoxypropyloxy)phenyl]benzoyl]-benzotriazole 3-oxide

IR (KBr) : 2944, 2869, 1770, 1600, 1494, 1249, 1189  $\text{cm}^{-1}$

25 NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 1.6-1.8 (2H, m), 1.8-2.0 (4H, m), 4.01 (2H, t, J=6.3Hz), 4.07 (2H, t, J=6.2Hz), 6.91 (2H, d, J=8.9Hz), 7.04 (2H, d, J=8.7Hz), 7.3-7.6 (4H, m), 7.63 (2H, d, J=8.6Hz), 7.78 (2H, d, J=8.4Hz), 8.12 (1H, d, J=8.1Hz), 8.32 (2H, d, J=8.4Hz)

APCI-MASS :  $m/z = 494 (M+H)^+$

30 Preparation 207

1-[4-[5-(4-Hexyloxyphenyl)-1,3,4-oxadiazol-2-yl]benzoyl]benzotriazole 3-oxide

IR (KBr) : 2956, 2921, 2856, 1778, 1612, 1496, 1261, 1232, 1025  $\text{cm}^{-1}$

- 1 NMR (CDCl<sub>3</sub>,  $\delta$ ) : 0.92 (3H, t, J=6.7Hz), 1.3-1.6 (6H, m), 1.8-2.0 (2H, m), 4.05 (2H, t, J=6.5Hz), 7.05 (2H, d, J=8.7Hz), 7.4-7.6 (3H, m), 8.10 (2H, d, J=8.7Hz), 8.13 (1H, d, J=7.4Hz), 8.37 (2H, d, J=8.5Hz), 8.45 (2H, d, J=8.5Hz)
- 5 APCI-MASS : m/z = 484 (M+H)<sup>+</sup>

CL Preparation 208

- CL 1-[4-[5-(4-n-Hexyloxyphenyl)-1,3,4-thiadiazol-2-yl]benzoyl]benzotriazole 3-oxide
- 10

IR (KBr) : 2952, 2873, 1774, 1602, 1261, 1230, 1176 cm<sup>-1</sup>

- 15 NMR (CDCl<sub>3</sub>,  $\delta$ ) : 0.93 (3H, t, J=6.8Hz), 1.3-2.0 (8H, m), 4.04 (2H, t, J=6.5Hz), 7.02 (2H, d, J=8.7Hz), 7.4-7.7 (3H, m), 7.98 (2H, d, J=8.7Hz), 8.13 (1H, d, J=8.7Hz), 8.25 (2H, d, J=8.3Hz), 8.41 (2H, d, J=8.3Hz)

APCI-MASS : m/z = 500 (M+H)<sup>+</sup>

20 CL Preparation 209

CL 1-[5-(4-Octyloxyphenyl)-1-methylpyrazol-3-yl-carbonyl]benzotriazole 3-oxide

IR (KBr pelet) : 2939, 2852, 1776, 1687, 1612, 1448, 1249, 995 cm<sup>-1</sup>

- 25 NMR (CDCl<sub>3</sub>,  $\delta$ ) : 0.89 (3H, t, J=6.7Hz), 1.3-1.5 (10H, m), 1.7-1.9 (2H, m), 4.01 (2H, t, J=6.5Hz), 4.25 (3H, s), 6.97 (2H, d, J=6.8Hz), 7.4-7.7 (4H, m), 7.78 (2H, d, J=6.8Hz), 8.14 (1H, d, J=8.0Hz)

APCI-MASS : m/z = 448 (M+H)<sup>+</sup>

30 CL Preparation 210

CL 1-[4-[5-(4-n-Pentyloxyphenyl)pyrazol-3-yl]benzoyl]benzotriazole 3-oxide

IR (KBr) : 3251, 2956, 2869, 1780, 1612, 1506, 1232, 985 cm<sup>-1</sup>

35

- $\rho$  NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 0.95 (3H, t,  $J=6.9\text{Hz}$ ), 1.3-1.6 (4H, m), 1.7-2.0 (2H, m), 4.01 (2H, t,  $J=6.6\text{Hz}$ ), 6.90 (1H, s), 6.99 (2H, d,  $J=8.7\text{Hz}$ ), 7.4-7.6 (5H, m), 8.0-8.2 (3H, m), 8.33 (2H, d,  $J=8.4\text{Hz}$ )
- 5  $\rho$  APCI-MASS :  $m/z = 468$  ( $M+H^+$ )

Preparation 211

- $\rho$  1-[5-[4-(4-n-Butoxyphenyl)phenyl]furan-2-yl-carbonyl]benzotriazole 3-oxide
- 10  $\rho$  IR (KBr) : 2958, 2871, 1781, 1678, 1603, 1535, 1479, 1265  $\text{cm}^{-1}$
- $\rho$  NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 1.00 (3H, t,  $J=7.3\text{Hz}$ ), 1.4-1.9 (4H, m), 4.02 (2H, t,  $J=6.4\text{Hz}$ ), 6.9-7.1 (3H, m), 7.4-8.2 (11H, m)
- 15  $\rho$  APCI-MASS :  $m/z = 351$  (Methyl ester)

Preparation 212

- $\rho$  1-(3-(S)-Hydroxy-2-benzylhexadecanoyl)benzotriazole 3-oxide
- 20  $\rho$  IR (Neat) : 2854.1, 1814.7, 1459.8, 742.5  $\text{cm}^{-1}$

Preparation 213

- $\rho$  1-(3-(R)-Benzyloxycarboxylamino-18-methoxyoctadecanoyl)-benzotriazole 3-oxide
- 25  $\rho$  IR (KBr) : 1805.0, 1729.8, 1695.1  $\text{cm}^{-1}$
- $\rho$  NMR ( $\text{DMSO}-d_6$ ,  $\delta$ ) : 1.1-1.65 (30H, m), 3.20 (3H, s), 3.28 (2H, t,  $J=6.5\text{Hz}$ ), 4.01 (1H, m), 5.06 (2H, s), 7.32 (5H, m), 7.4-7.8 (3H, m), 8.12 (1H, d,  $J=7\text{Hz}$ )

Preparation 214

- $\rho$  1-(3-(S)-Hydroxyhexadecanoyl)benzotriazole 3-oxide
- $\rho$  IR (KBr) : 1710.6, 1498.4, 1429.0, 771.4  $\text{cm}^{-1}$
- $\rho$  NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 0.88 (3H, t,  $J=6.4\text{Hz}$ ), 1.2-1.7 (24H, m), 2.00 (1H, s), 3.1-3.5 (2H, m), 4.30 (1H, m), 7.59 (1H, t,  $J=7.8\text{Hz}$ ), 7.81 (1H, t,  $J=7.8\text{Hz}$ ), 8.02
- 35



(1H, d, J=8.3Hz), 8.42 1(1H, d, J=8.3Hz)

CL Preparation 215

5 CL 1-(3-Methyl-2-tridecenoyl)benzotriazole 3-oxide  
P IR (KBr) : 2927.4, 1791.5, 1633.4, 1081.9  $\text{cm}^{-1}$   
P NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 0.89 (3H, t, J=6.3Hz), 1.1-1.7 (20H, m), 2.25 (3H, s), 6.08 (1H, s), 7.3-7.6 (3H, m), 8.06 (1H, d, J=8.2Hz)

10 CL Preparation 216

CL 1-[4-[4-[4-(8-Methoxyoctyloxy)phenyl]piperazin-1-yl]benzoyl]benzotriazole 3-oxide  
P IR (KBr) : 1780.0, 1600.6, 1511.9, 1234.2, 1184.1  $\text{cm}^{-1}$   
P NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 1.3-1.9 (12H, m), 3.24 (4H, t, J=5.0Hz), 3.33 (3H, s), 3.37 (2H, t, J=6.8Hz), 3.62 (4H, t, J=5.0Hz), 3.92 (2H, t, J=6.5Hz), 6.8-7.1 (6H, m), 7.35-7.65 (3H, m), 8.09 (1H, d, J=8.2Hz), 8.15 (2H, d, J=9.0Hz)

20 CL Preparation 217

CL 1-[3-Fluoro-4-[4-(4-n-hexyloxyphenyl)piperazin-1-yl]benzoyl]benzotriazole 3-oxide  
P IR (KBr) : 1778.0  $\text{cm}^{-1}$

25 CL Preparation 218

CL 1-[3-Chloro-4-[4-(4-n-hexyloxyphenyl)piperazin-1-yl]benzoyl]benzotriazole 3-oxide  
P IR (KBr) : 1778.0, 1594.8, 1511.9, 1218.8  $\text{cm}^{-1}$   
P NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 0.91 (3H, t, J=6.5Hz), 1.2-1.6 (6H, m), 1.6-1.9 (2H, m), 3.29 (4H, t, J=3.6Hz), 3.44 (4H, t, J=3.6Hz), 3.93 (2H, t, J=6.5Hz), 6.87 (2H, d, J=9.2Hz), 6.97 (2H, d, J=9.2Hz), 7.19 (1H, d, J=8.6Hz), 7.4-7.7 (3H, m), 8.10 (1H, d, J=6.4Hz), 8.14 (1H, dd, J=8.6 and 2.1Hz), 8.27 (1H, d, J=2.1Hz)

APCI-MASS :  $m/z = 534 (M^+ + H)$

Preparation 219

1-[[4-(4-piperidinopiperidin-1-yl)benzoyl]benzotriazole  
3-oxide

IR (KBr) : 1758.8, 1602.6, 1186.0  $\text{cm}^{-1}$

NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 1.35-1.8 (8H, m), 1.96 (2H, d,  $J=13\text{Hz}$ ), 2.45-2.7 (5H, m), 2.97 (2H, td,  $J=12.8$  and  $2.6\text{Hz}$ ), 4.04 (2H, d,  $J=13\text{Hz}$ ), 6.93 (2H, d,  $J=9.2\text{Hz}$ ), 7.35-7.6 (3H, m), 8.1-8.4 (3H, m).

Preparation 220

1-[[3-[4-(4-n-Hexyloxyphenyl)piperazin-1-yl]pyridazin-6-yl-carbonyl]benzotriazole 3-oxide

IR (KBr) : 1787.7, 1585.2, 1511.9, 1240.0  $\text{cm}^{-1}$

Preparation 221

1-[[5-[4-(4-n-Hexyloxyphenyl)piperazin-1-yl]picolinoyl]benzotriazole 3-oxide

IR (KBr) : 1766.5, 1575.6, 1511.9, 1232.3  $\text{cm}^{-1}$

NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 0.91 (3H, t,  $J=6.5\text{Hz}$ ), 1.2-1.6 (6H, m), 1.65-1.9 (2H, m), 3.27 (4H, t,  $J=5.1\text{Hz}$ ), 3.66 (4H, t,  $J=5.1\text{Hz}$ ), 3.93 (2H, t,  $J=6.5\text{Hz}$ ), 6.88 (2H, d,  $J=9.2\text{Hz}$ ), 6.95 (2H, d,  $J=9.2\text{Hz}$ ), 7.25 (1H, dd,  $J=7.6$  and  $2.9\text{Hz}$ ), 7.35-7.6 (3H, m), 8.09 (1H, d,  $J=8.2\text{Hz}$ ), 8.18 (1H, d,  $J=8.9\text{Hz}$ ), 8.52 (1H, d,  $J=2.9\text{Hz}$ )

APCI-MASS :  $m/z = 501 (M^+ + H)$

Preparation 222

1-[[4-[4-(4-Cyclohexylphenyl)piperazin-1-yl]benzoyl]benzotriazole 3-oxide

IR (KBr) : 1770.3, 1602.6, 1515.8, 1232.3, 1186.0  $\text{cm}^{-1}$

NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 1.15-1.5 (6H, m), 1.65-2.0 (4H, m), 2.45 (1H, m), 3.33 (4H, t,  $J=5.1\text{Hz}$ ), 3.62 (4H, t,

J=5.1Hz), 6.92 (2H, d, J=8.7Hz), 6.99 (2H, d, J=9.2Hz), 7.16 (2H, d, J=8.7Hz), 7.35-7.65 (3H, m), 8.09 (1H, d, J=8.2Hz), 8.15 (2H, d, J=9.2Hz)

5 Preparation 223

1-[4-[4-(4-n-Hexylphenyl)piperazin-1-yl]benzoyl]-benzotriazole 3-oxide

IR (KBr) : 1768.4, 1602.6, 1515.8, 1230.4, 1184.1  $\text{cm}^{-1}$

10  $\text{NMR (CDCl}_3, \delta)$  : 0.89 (3H, t, J=6.5Hz), 1.2-1.45 (6H, m), 1.5-1.7 (2H, m), 2.55 (2H, t, J=7.6Hz), 3.2-3.4 (4H, m), 3.5-3.7 (4H, m), 6.91 (2H, d, J=8.6Hz), 7.00 (2H, d, J=9.1Hz), 7.13 (2H, d, J=8.5Hz), 7.35-7.6 (3H, m), 8.09 (1H, d, J=8.2Hz), 8.15 (2H, d, J=9.1Hz)

15 Preparation 224

1-[4-[4-(4-Phenylcyclohexyl)piperazin-1-yl]benzoyl]benzotriazole 3-oxide

IR (KBr) : 1780.0, 1762.6, 1602.6, 1234.2, 1182.2  $\text{cm}^{-1}$

20  $\text{NMR (CDCl}_3, \delta)$  : 1.3-1.7 (4H, m), 1.95-2.15 (4H, m), 2.35-2.6 (2H, m), 2.79 (4H, t, J=5.0Hz), 3.49 (4H, t, J=5.0Hz), 6.95 (2H, d, J=9.0Hz), 7.1-7.35 (5H, m), 7.35-7.6 (3H, m), 8.08 (1H, d, J=7.1Hz), 8.12 (2H, d, J=9.0Hz)

25 Preparation 225

1-[4-[4-[1-(4-n-Hexyloxyphenyl)piperidin-4-yl]piperazin-1-yl]benzoyl]benzotriazole 3-oxide

IR (KBr) : 1768.4, 1602.6, 1511.9, 1234.2  $\text{cm}^{-1}$

30  $\text{NMR (CDCl}_3, \delta)$  : 0.90 (3H, t, J=6.5Hz), 1.2-1.55 (6H, m), 1.6-1.9 (4H, m), 1.96 (2H, d, J=11Hz), 2.44 (1H, m), 2.64 (2H, d, J=1.1Hz), 2.77 (4H, t, J=5.0Hz), 3.48 (4H, t, J=5.0Hz), 3.59 (2H, d, J=11Hz), 3.91 (2H, t, J=6.5Hz), 6.7-7.05 (6H, m), 7.35-7.6 (3H, m), 8.08 (1H, d, J=6.9Hz), 8.12 (2H,

35

d,  $J=7.7\text{Hz}$ )

CL Preparation 226

CL 1-[4-(4-Trans-n-pentylcyclohexyl)benzoyl]benzotriazole  
5 3-oxide

IR (KBr) : 1799.3, 1778.0, 1608.3, 1228.4, 977.7  $\text{cm}^{-1}$

NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 0.91 (3H, t,  $J=6.6\text{Hz}$ ), 1.0-1.7 (13H, m), 1.93 (4H, d,  $J=9.8\text{Hz}$ ), 2.62 (1H, t,  $J=12\text{Hz}$ ), 7.35-7.6 (5H, m), 8.09 (1H, d,  $J=7.9\text{Hz}$ ), 8.19 (2H, d,  $J=8.4\text{Hz}$ )

CL Preparation 227

CL 1-[6-(8-Methoxyoctyloxy)-2-naphthoyl]benzotriazole 3-oxide

15 IR (KBr) : 2931.3, 2856.1, 1778.0, 1623.8  $\text{cm}^{-1}$

CL Preparation 228

CL 1-(E)-[3-[4-[4-(7-Fluoroheptyloxy)phenyl]phenyl]-acryloyl]benzotriazole 3-oxide

20 IR (KBr) : 3070.1, 2935.1, 2859.9, 1700.9, 1619.9, 1596.8  $\text{cm}^{-1}$

NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 1.30-2.00 (10H, m), 4.02 (2H, t,  $J=6.4\text{Hz}$ ), 4.45 (2H, dt,  $J=47.5$  and  $6.2\text{Hz}$ ), 6.70-8.65 (14H, m)

25 CL Preparation 229

CL 1-(6-Heptylnaphthalene-2-carbonyl)benzotriazole 3-oxide

30 NMR ( $\text{DMSO}-d_6$ ,  $\delta$ ) : 0.75-0.93 (3H, m), 1.10-1.45 (8H, m), 1.55-1.80 (2H, m), 2.68-2.90 (2H, m), 7.35-9.06 (10H, m)

APCI-MASS :  $m/z = 388$  ( $M^++1$ )

CL Preparation 230

CL 1-(E)-[3-[4-[4-(8-Methoxyoctyloxy)phenyl]phenyl]-acryloyl]benzotriazole 3-oxide

CL Preparation 231

P 1-(E)-[3-[4-[4-(5-Hexenyloxy)phenyl]phenyl]acryloyl]-  
benzotriazole 3-oxide

5 P IR (KBr) : 3072.0, 3033.5, 2939.0, 2865.7, 1780.0,  
1693.2, 1619.9, 1596.8  $\text{cm}^{-1}$

P NMR ( $\text{DMSO-d}_6$ ,  $\delta$ ) : 1.43-1.66 (2H, m), 1.66-1.90 (2H,  
m), 2.02-2.23 (2H, m), 3.90-4.16 (2H, m), 4.90-5.13  
(2H, m), 5.72-6.00 (1H, m), 6.93-8.30 (14H, m)

P APCI-MASS :  $m/z$  = 337 (Methyl ester,  $M^+ + 1$ )

10

CL Preparation 232

CL P 1-(E)-[3-[4-[4-(4-Methylpentyloxy)phenyl]phenyl]-  
acryloyl]benzotriazole 3-oxide

15 P IR (KBr) : 3072.0, 3033.5, 2952.5, 2869.6, 1780.0,  
1693.2, 1618.0, 1598.7  $\text{cm}^{-1}$

P NMR ( $\text{DMSO-d}_6$ ,  $\delta$ ) : 0.90 (6H, d,  $J=6.5\text{Hz}$ ), 1.20-1.40  
(2H, m), 1.50-1.90 (3H, m), 3.90-4.10 (2H, m),  
6.40-8.30 (14H, m)

P APCI-MASS :  $m/z$  = 442 ( $M^+ + 1$ )

20

CL Preparation 233

CL P 1-(E)-[3-[4-[4-(6-Fluorohexyloxy)phenyl]phenyl]-  
acryloyl]benzotriazole 3-oxide

25 P IR (KBr) : 3074.0, 3033.5, 2939.0, 2865.7, 1780.0,  
1697.1, 1598.7  $\text{cm}^{-1}$

P NMR ( $\text{DMSO-d}_6$ ,  $\delta$ ) : 1.25-1.83 (6H, m), 4.04 (2H, t,  
 $J=6.5\text{Hz}$ ), 4.45 (2H, dt,  $J=47.5$  and  $6.5\text{Hz}$ ), 6.9-8.3  
(14H, m)

P APCI-MASS :  $m/z$  = 460 ( $M^+ + 1$ )

30

CL Preparation 234

CL P 1-(E)-[3-[4-[4-(6-Methoxyhexyloxy)phenyl]phenyl]-  
acryloyl]benzotriazole 3-oxide

35 P NMR ( $\text{DMSO-d}_6$ ,  $\delta$ ) : 1.30-1.65 (6H, m), 1.65-1.90 (2H,  
m), 3.22 (3H, s), 3.22-3.40 (2H, m), 4.02 (2H, t,

J=6.5Hz), 6.5-8.3 (14H, m)

CL Preparation 235

5 CL 1-[4-[3-(4-n-Hexyloxyphenyl)pyrazol-5-yl]benzoyl]benzotriazole 3-oxide

P IR (KBr) : 2935, 1780, 1610, 1506 1249, 1232, 1178, 1087  $\text{cm}^{-1}$

10 P NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 0.91 (3H, d, J=6.4Hz), 1.2-1.6 (6H, m), 1.7-1.9 (2H, m), 3.98 (2H, t, J=6.5Hz), 6.8-7.0 (3H, m), 7.4-7.6 (5H, m), 8.00 (2H, d, J=8.4Hz), 8.10 (1H, d, J=8.1Hz), 8.28 (1H, d, J=8.4Hz)

P APCI-MASS : m/z = 482 ( $\text{M}+\text{H}^+$ )

CL Preparation 236

15 CL 1-[4-[4-[4-(6-Methoxyhexyloxy)phenyl]phenyl]benzoyl]benzotriazole 3-oxide

P IR (KBr) : 2935, 2858, 1774, 1600, 1490, 1257, 1211  $\text{cm}^{-1}$

20 P NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 1.4-1.9 (8H, m), 3.35 (3H, s), 3.40 (2H, t, J=6.3Hz), 4.02 (2H, t, J=6.4Hz), 7.00 (2H, d, J=8.7Hz), 7.4-7.8 (7H, m), 7.87 (2H, d, J=8.4Hz), 8.12 (1H, d, J=8.2Hz), 8.36 (2H, d, J=8.4Hz)

P APCI-MASS : m/z = 522 ( $\text{M}+\text{H}^+$ )

25 CL Preparation 237

CL 1-[4-[5-[4-(8-Methoxyoctyloxy)phenyl]-1,3,4-thiadiazol-2-yl]benzoyl]benzotriazole 3-oxide

P IR (KBr) : 2929, 2854, 1776, 1602, 1469, 1255  $\text{cm}^{-1}$

30 P NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 1.2-1.6 (10H, m), 1.7-1.9 (2H, m), 3.33 (3H, s), 3.37 (2H, d, J=6.4Hz), 4.03 (2H, d, J=6.5Hz), 7.00 (2H, d, J=8.9Hz), 7.4-7.6 (3H, m), 7.97 (2H, d, J=8.9Hz), 8.12 (1H, d, J=8.2Hz), 8.23 (2H, d, J=8.7Hz), 8.39 (2H, d, J=8.7Hz)

35 P APCI-MASS : m/z = 558 ( $\text{M}+\text{H}^+$ )

CL Preparation 238

CL 1-[4-(4-n-Butoxyphenyl)cinnamoyl]benzotriazole 3-oxide

P IR (KBr) : 2952, 2867, 1778, 1598, 1496, 1249,  
1186  $\text{cm}^{-1}$

5 P NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 0.99 (3H, t,  $J=7.3\text{Hz}$ ), 1.55 (2H, tq,  
 $J=7.0$  and  $7.3\text{Hz}$ ), 1.78 (2H, tt,  $J=7.0$  and  $6.4\text{Hz}$ ),  
4.02 (2H, t,  $J=6.4\text{Hz}$ ), 6.75 (1H, d,  $J=16.0\text{Hz}$ ), 7.00  
(2H, d,  $J=8.7\text{Hz}$ ), 7.4-8.2 (9H, m)

P APCI-MASS :  $m/z = 414$  ( $M+H^+$ )

10

CL Preparation 239

CL 1-[4-[5-(4-Cyclohexylphenyl)-1,3,4-thiadiazol-2-yl]benzoyl]benzotriazole 3-oxide

P IR (KBr) : 2925, 2850, 1778, 1230, 989  $\text{cm}^{-1}$

15 P NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 1.2-1.6 (5H, m), 1.7-2.0 (5H, m),  
2.5-2.7 (1H, m), 7.37 (2H, d,  $J=8.3\text{Hz}$ ), 7.4-7.6  
(3H, m), 7.97 (2H, d,  $J=8.3\text{Hz}$ ), 8.13 (1H, d,  
 $J=8.2\text{Hz}$ ), 8.26 (2H, d,  $J=8.6\text{Hz}$ ), 8.42 (2H, d,  
 $J=8.6\text{Hz}$ )

20 P APCI-MASS :  $m/z = 482$  ( $M+H^+$ )

CL Preparation 240

CL 1-[4-[5-[4-(4-n-Propyloxyphenyl)phenyl]-1,3,4-oxadiazol-2-yl]benzoyl]benzotriazole 3-oxide

25 P IR (KBr) : 1778, 1604, 1488, 1249, 1232, 998  $\text{cm}^{-1}$

P NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 1.07 (3H, t,  $J=7.4\text{Hz}$ ), 1.85 (2H, tq,  
 $J=6.5$  and  $7.4\text{Hz}$ ), 7.02 (2H, d,  $J=8.8\text{Hz}$ ), 7.4-7.7  
(3H, m), 7.61 (2H, d,  $J=8.8\text{Hz}$ ), 7.75 (2H, d,  
 $J=8.5\text{Hz}$ ), 8.14 (1H, d,  $J=8.2\text{Hz}$ ), 8.22 (2H, d,  
 $J=8.5\text{Hz}$ ), 8.40 (2H, d,  $J=8.8\text{Hz}$ ), 8.48 (2H, d,  
 $J=8.8\text{Hz}$ )

30

P APCI-MASS :  $m/z = 518$  ( $M+H^+$ )

CL Preparation 241

35 CL 1-[4-(5-n-Nonyl-1,3,4-oxadiazol-2-yl)benzoyl]-

benzotriazole 3-oxide

IR (KBr) : 2919, 2850, 1780, 1565, 1415, 1251  $\text{cm}^{-1}$

NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 0.89 (3H, t,  $J=6.7\text{Hz}$ ), 1.2-1.6 (12H, m), 1.8-2.0 (2H, m), 2.98 (2H, t,  $J=7.7\text{Hz}$ ), 7.4-7.6 (3H, m), 8.12 (1H, d,  $J=9.0\text{Hz}$ ), 8.28 (2H, d,  $J=8.7\text{Hz}$ ), 8.42 (2H, d,  $J=8.7\text{Hz}$ )

APCI-MASS :  $m/z = 434$  ( $M+H^+$ )

CL

Preparation 242

10 CL 1-[4-[3-(4-n-Hexyloxyphenyl)-1,2,4-oxadiazol-5-yl]-benzoyl]benzotriazole 3-oxide

IR (KBr) : 2946, 2869, 1780, 1251, 1230, 1001  $\text{cm}^{-1}$

NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 0.92 (3H, t,  $J=6.8\text{Hz}$ ), 1.3-1.6 (6H, m), 1.8-1.9 (2H, m), 4.04 (2H, t,  $J=6.5\text{Hz}$ ), 7.03 (2H, d,  $J=8.9\text{Hz}$ ), 7.4-7.6 (3H, m), 8.0-8.2 (3H, m), 8.46 (4H, s)

APCI-MASS :  $m/z = 484$  ( $M+H^+$ )

CL

Preparation 243

20 CL 1-[4-[5-(4-n-Octyloxyphenyl)-1,3,4-thiadiazol-2-yl]-benzoyl]benzotriazole 3-oxide

IR (KBr) : 2925, 2856, 1774, 1602, 1259, 1232, 989  $\text{cm}^{-1}$

NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 0.90 (3H, t,  $J=6.7\text{Hz}$ ), 1.1-1.6 (10H, m), 1.7-1.9 (2H, m), 4.04 (2H, t,  $J=6.5\text{Hz}$ ), 7.01 (2H, d,  $J=8.9\text{Hz}$ ), 7.4-7.6 (3H, m), 7.97 (2H, d,  $J=8.8\text{Hz}$ ), 8.12 (1H, d,  $J=8.2\text{Hz}$ ), 8.24 (2H, d,  $J=8.6\text{Hz}$ ), 8.40 (2H, d,  $J=8.6\text{Hz}$ )

APCI-MASS :  $m/z = 528$  ( $M+H^+$ )

30 CL Preparation 244

CL 1-[4-[5-(4-Trans-n-pentylcyclohexyl)-1,3,4-thiadiazol-2-yl]benzoyl]benzotriazole 3-oxide

IR (KBr) : 2952, 2919, 2848, 1785, 1444, 1226, 991  $\text{cm}^{-1}$

NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 0.90 (3H, t,  $J=6.9\text{Hz}$ ), 1.0-1.7 (13H, m), 1.94 (2H, d,  $J=12.0\text{Hz}$ ), 2.27 (2H, d,  $J=12.0\text{Hz}$ ),



3.19 (1H, tt, J=12.0 and 3.6Hz), 7.4-7.6 (3H, m),  
8.12 (1H, d, J=8.0Hz), 8.19 (2H, d, J=8.6Hz), 8.38  
(2H, d, J=8.6Hz)

⌘ APCI-MASS : m/z = 476 (M+H<sup>+</sup>)

5

CL

Preparation 245

CL 1-[4-[3-(4-n-Pentyloxyphenyl)isoxazol-5-yl]benzoyl]benzotriazole 3-oxide

⌘ IR (KBr) : 2948, 2867, 1776, 1610, 1436, 1253, 1002 cm<sup>-1</sup>

10 ⌘ NMR (CDCl<sub>3</sub>, δ) : 0.95 (3H, t, J=7.1Hz), 1.2-1.6 (4H, m), 1.7-1.9 (2H, m), 4.02 (2H, t, J=6.5Hz), 7.0-7.1 (3H, m), 7.4-7.6 (3H, m), 7.81 (2H, d, J=8.8Hz), 8.06 (2H, d, J=8.6Hz), 8.12 (1H, d, J=8.0Hz), 8.39 (2H, d, J=8.6Hz)

15 ⌘ APCI-MASS : m/z = 469 (M+H<sup>+</sup>)

CL

Preparation 246

CL 1-[4-[5-[4-(8-Methoxyoctyloxy)phenyl]-1,3,4-oxadiazol-2-yl]benzoyl]benzotriazole 3-oxide

20 ⌘ IR (KBr) : 2923, 2854, 1787, 1608, 1494, 1255, 1228, 993 cm<sup>-1</sup>

⌘ NMR (CDCl<sub>3</sub>, δ) : 1.2-1.6 (10H, m), 1.7-1.9 (2H, m), 3.34 (3H, s), 3.38 (2H, t, J=6.4Hz), 4.05 (2H, t, J=6.5Hz), 7.04 (2H, d, J=8.8Hz), 7.4-7.6 (3H, s), 8.1-8.2 (3H, s), 8.36 (2H, d, J=8.7Hz), 8.45 (2H, d, J=8.7Hz)

⌘ APCI-MASS : m/z = 542 (M+H<sup>+</sup>)

CL

Preparation 247

30 CL 1-[4-[4-(6-Phenylpyridazin-3-yl-oxy)phenyl]benzoyl]benzotriazole 3-oxide

⌘ IR (KBr) : 1783, 1604, 1423, 1284, 985 cm<sup>-1</sup>

⌘ NMR (CDCl<sub>3</sub>, δ) : 7.2-8.2 (15H, m), 8.12 (2H, d, J=8.3Hz), 8.36 (2H, d, J=8.4Hz)

35 ⌘ APCI-MASS : m/z = 486 (M<sup>+</sup>+1)

CL Preparation 248

CL 1-[4-[5-(4-n-Octyloxyphenyl)-1,3,4-oxadiazol-2-yl]benzoyl]benzotriazole 3-oxide

5 P IR (KBr) : 2925, 2854, 1780, 1610, 1496, 1257, 1228, 1180  $\text{cm}^{-1}$

P NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 0.89 (3H, t,  $J=6.8\text{Hz}$ ), 1.2-2.0 (12H, m), 4.05 (2H, t,  $J=6.5\text{Hz}$ ), 7.05 (2H, d,  $J=8.7\text{Hz}$ ), 7.4-7.6 (3H, m), 8.0-8.2 (3H, m), 8.37 (2H, d,  $J=8.6\text{Hz}$ ), 8.45 (2H, d,  $J=8.6\text{Hz}$ )

10 P APCI-MASS :  $m/z = 512$  ( $M+H^+$ )

CL Preparation 249

CL 1-[4-[2-(4-n-Hexyloxyphenyl)pyrimidin-6-yl]benzoyl]benzotriazole 3-oxide

15 P IR (KBr) : 2948, 2861, 1780, 1552, 1413, 1378, 987  $\text{cm}^{-1}$

P NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 0.92 (3H, t,  $J=6.8\text{Hz}$ ), 1.2-1.6 (6H, m), 1.8-2.0 (2H, m), 4.06 (2H, t,  $J=6.5\text{Hz}$ ), 7.04 (2H, d,  $J=9.0\text{Hz}$ ), 7.4-7.6 (3H, m), 7.64 (1H, d,  $J=5.2\text{Hz}$ ), 8.13 (1H, d,  $J=8.2\text{Hz}$ ), 8.44 (4H, s), 8.55 (2H, d,  $J=9.0\text{Hz}$ ), 8.90 (1H, d,  $J=5.2\text{Hz}$ )

20

P APCI-MASS :  $m/z = 494$  ( $M+H^+$ )

CL Preparation 250

CL 1-[4-[4-[8-(2-Ethoxyethoxy)octyloxy]phenyl]benzoyl]benzotriazole 3-oxide

25 P IR (KBr) : 2933, 2861, 1778, 1598, 1247, 1186, 977  $\text{cm}^{-1}$

P NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 1.22 (3H, t,  $J=7.0\text{Hz}$ ), 1.3-2.0 (14H, m), 3.4-3.6 (6H, m), 4.02 (2H, t,  $J=6.5\text{Hz}$ ), 7.02 (2H, d,  $J=8.8\text{Hz}$ ), 7.4-7.6 (3H, m), 7.62 (2H, d,  $J=8.8\text{Hz}$ ), 7.78 (2H, d,  $J=8.6\text{Hz}$ ), 8.10 (1H, d,  $J=8.9\text{Hz}$ ), 8.31 (2H, d,  $J=8.6\text{Hz}$ )

30

P APCI-MASS :  $m/z = 532$  ( $M+H^+$ )

CL Preparation 251

35 CL 1-[4-[4-[7-(Piperidin-1-yl-carbonyl)heptyloxy]phenyl]-

benzoyl]benzotriazole 3-oxide

IR (KBr) : 2935, 2856, 1774, 1631, 1598, 1255,  
1191  $\text{cm}^{-1}$

NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 1.3-2.0 (16H, m), 2.37 (2H, t,  $J=7.6\text{Hz}$ ), 3.48 (4H, s), 4.02 (2H, t,  $J=6.4\text{Hz}$ ), 7.02 (2H, d,  $J=8.6\text{Hz}$ ), 7.4-7.6 (3H, m), 7.63 (2H, d,  $J=8.6\text{Hz}$ ), 7.78 (2H, d,  $J=8.3\text{Hz}$ ), 8.11 (1H, d,  $J=8.1\text{Hz}$ ), 8.31 (2H, d,  $J=8.3\text{Hz}$ )

APCI-MASS :  $m/z = 541$  ( $M+H^+$ )

10

Preparation 252

1-[6-[4-(4-n-Heptyloxyphenyl)piperazin-1-yl]nicotinoyl]-benzotriazole 3-oxide

IR (KBr) : 2929, 2856, 1762, 1604, 1510, 1240  $\text{cm}^{-1}$

NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 0.89 (3H, t,  $J=6.7\text{Hz}$ ), 1.2-1.9 (10H, m), 3.20 (4H, t,  $J=5.0\text{Hz}$ ), 3.8-4.0 (6H, m), 6.75 (1H, d,  $J=9.5\text{Hz}$ ), 6.86 (2H, d,  $J=9.3\text{Hz}$ ), 6.95 (2H, d,  $J=9.3\text{Hz}$ ), 7.3-7.6 (3H, m), 8.10 (1H, d,  $J=8.2\text{Hz}$ ), 8.19 (1H, dd,  $J=9.2$  and  $2.3\text{Hz}$ ), 9.05 (1H, d,  $J=2.3\text{Hz}$ )

20

APCI-MASS :  $m/z = 515$  ( $M+H^+$ )

Preparation 253

1-[6-[4-[4-(8-Methoxyoctyloxy)phenyl]piperazin-1-yl]nicotinoyl]benzotriazole 3-oxide

IR (KBr) : 2929, 2854, 1766, 1602, 1510, 1419,  
1234  $\text{cm}^{-1}$

NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 1.3-1.9 (12H, m), 3.2-3.3 (4H, m), 3.33 (3H, s), 3.36 (2H, t,  $J=6.4\text{Hz}$ ), 3.92 (2H, t,  $J=6.5\text{Hz}$ ), 4.0-4.2 (4H, m), 6.75 (1H, d,  $J=9.1\text{Hz}$ ), 6.87 (2H, d,  $J=8.9\text{Hz}$ ), 7.0-7.2 (2H, m), 7.4-7.6 (3H, m), 8.09 (1H, d,  $J=8.1\text{Hz}$ ), 8.20 (1H, dd,  $J=9.1$  and  $2.3\text{Hz}$ ), 9.05 (1H, d,  $J=2.3\text{Hz}$ )

30

APCI-MASS :  $m/z = 559$  ( $M+H^+$ )

35

CL Preparation 254

CL 1-[4-[5-[4-(4-n-Propyloxyphenyl)phenyl]-1,3,4-thiadiazol-2-yl]benzoyl]benzotriazole 3-oxide

- IR (KBr) : 1774, 1600, 1234, 985  $\text{cm}^{-1}$
- 5  $\int$  NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 1.07 (3H, t,  $J=7.3\text{Hz}$ ), 1.85 (2H, tq,  $J=6.5$  and  $7.3\text{Hz}$ ), 3.99 (2H, t,  $J=6.5\text{Hz}$ ), 7.01 (2H, d,  $J=8.7\text{Hz}$ ), 7.4-7.7 (5H, m), 7.72 (2H, d,  $J=8.7\text{Hz}$ ), 8.1-8.2 (2H, m), 8.28 (2H, d,  $J=8.6\text{Hz}$ ), 8.44 (2H, d,  $J=8.6\text{Hz}$ )
- 10  $\int$  APCI-MASS :  $m/z = 534 (\text{M}+\text{H})^+$

The following compounds (Preparations 255 to 256) were obtained according to a similar manner to that of Preparation 32.

15

CL Preparation 255

CL 6-Heptylnaphthalene-2-carboxylic acid

- $\int$  NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 0.88 (3H, t,  $J=6.6\text{Hz}$ ), 1.15-1.53 (8H, m), 1.58-1.88 (2H, m), 2.80 (2H, t,  $J=7.6\text{Hz}$ ), 7.42 (1H, dd,  $J=1.7$  and  $8.4\text{Hz}$ ), 7.67 (1H, s), 7.84 (1H, d,  $J=8.6\text{Hz}$ ), 7.90 (1H, d,  $J=8.4\text{Hz}$ ), 8.09 (1H, dd,  $J=1.7$  and  $8.6\text{Hz}$ ), 8.68 (1H, s)
- 20  $\int$  APCI-MASS :  $m/z = 271 (\text{M}^++1)$ , 285 (methyl ester $^+-1$ )

25 CL Preparation 256

CL 3-(E)-[4-[4-(7-Fluoroheptyloxy)phenyl]phenyl]acrylic acid

- $\int$  IR (KBr) : 3037.3, 2935.1, 2861.8, 1679.7, 1633.4, 1600.6  $\text{cm}^{-1}$
- 30  $\int$  NMR ( $\text{DMSO}-d_6$ ,  $\delta$ ) : 1.30-1.85 (10H, m), 4.01 (2H, t,  $J=6.4\text{Hz}$ ), 4.44 (2H, dt,  $J=47.6$  and  $6.1\text{Hz}$ ), 6.54 (1H, d,  $J=15.9\text{Hz}$ ), 7.02 (2H, d,  $J=8.7\text{Hz}$ ), 7.53-7.80 (7H, m)

35 CL Preparation 257

To a solution of 4-methylpentanol (3.0 ml) in pyridine (20 ml) were added in turn with p-toluenesulfonyl chloride (4.6 g) and 4-N,N-dimethylaminopyridine (1.5 g) at ambient temperature. After stirring at ambient temperature, the reaction mixture was taken up into a mixture of ethyl acetate (100 ml) and water (100 ml). The separated organic layer was washed in turn with hydrochloric acid (1N), water, aqueous sodium hydrogencarbonate, and brine, and dried over magnesium sulfate. Evaporation gave 1-p-Toluenesulfonyloxy-4-methylpentane (5.30 g).

$^1\text{H}$  NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 0.83 (6H, d,  $J=6.6\text{Hz}$ ), 1.48 (1H, sept,  $J=6.6\text{Hz}$ ), 1.50-1.70 (2H, m), 2.45 (3H, s), 4.00 (2H, t,  $J=6.6\text{Hz}$ ), 7.34 (2H, d,  $J=8.1\text{Hz}$ ), 7.79 (2H, d,  $J=8.1\text{Hz}$ )

$^{\text{A}}$  APCI-MASS :  $m/z = 257$  ( $\text{M}^++1$ )

Preparation 258

To a solution of 4-bromo-4'-n-butyloxybiphenyl (3.05 g) in tetrahydrofuran (60 ml) was added 1.55M n-butyllithium in n-hexane (7.74 ml) at  $-60^\circ\text{C}$  over a period of 10 minutes. The solution was stirred at  $-30^\circ\text{C}$  for 1.5 hours and cooled to  $-60^\circ\text{C}$ . To the solution was added triisopropylborate (3.46 ml) over a period of 5 minutes, and the mixture was stirred for 1.5 hours without cooling. To the solution was added 1N hydrochloric acid (20 ml) and the solution was stirred for 30 minutes and extracted with ethyl acetate. The organic layer was separated and washed with water, brine and dried over magnesium sulfate. The solvents were removed under reduced pressure and the residue was triturated with n-hexane. The solid was collected by filtration and dried under reduced pressure to give 4-(4-n-Butyloxyphenyl)phenylboronic acid (2.31 g).

$^{\text{A}}$  IR (KBr) : 3398, 2956, 2919, 2871, 1604, 1531, 1392, 1257  $\text{cm}^{-1}$

$^{\text{A}}$  NMR ( $\text{DMSO}-d_6$ ,  $\delta$ ) : 0.94 (3H, t,  $J=7.3\text{Hz}$ ), 1.4-1.8 (4H,

m), 4.01 (2H, t, J=6.3Hz), 7.01 (2H, d, J=8.7Hz),  
7.58 (2H, d, J=7.9Hz), 7.62 (2H, d, J=8.7Hz), 7.84  
(2H, d, J=7.9Hz), 8.03 (2H, s)

5 The following compounds (Preparations 259 to 260) were  
obtained according to a similar manner to that of Preparation  
258.

CL Preparation 259

10 CL 4-[4-(6-Methoxyhexyloxy)phenyl]phenylboronic acid  
P IR (KBr) : 3448, 3392, 2937, 2861, 1606, 1529, 1346,  
1288  $\text{cm}^{-1}$   
P NMR (DMSO- $\text{d}_6$ ,  $\delta$ ) : 1.3-1.8 (8H, m), 3.21 (3H, s), 3.31  
(2H, t, J=6.3Hz), 3.99 (2H, t, J=6.4Hz), 7.00 (2H,  
15 d, J=8.7Hz), 7.5-7.7 (4H, m), 7.84 (2H, d,  
J=8.1Hz), 8.03 (2H, s)  
P APCI-MASS : m/z = 329 ( $\text{M}+\text{H}^+$ )

CL Preparation 260

20 CL 4-[4-(5-Methoxypentyloxy)phenyl]phenylboronic acid  
P IR (KBr) : 3473, 3369, 3330, 2935, 2863, 1604, 1531,  
1338, 1251  $\text{cm}^{-1}$   
P NMR (DMSO- $\text{d}_6$ ,  $\delta$ ) : 1.4-1.8 (6H, m), 3.22 (3H, s), 3.3-  
3.4 (2H, m), 3.99 (2H, t, J=6.4Hz), 7.00 (2H, d,  
25 J=8.7Hz), 7.58 (2H, d, J=8.0Hz), 7.61 (2H, d,  
J=8.7Hz), 7.84 (2H, d, J=8.0Hz), 8.04 (2H, s)  
P APCI-MASS : m/z = 315 ( $\text{M}+\text{H}^+$ )

CL Preparation 261

30 To a suspension of 4-Methoxycarbonylphenyl boronic acid  
(648 mg) and 4-iodo-1-heptylpyrazole (876 mg) and  $\text{Pd}(\text{PPh}_3)_4$   
(173 mg) in 1,2-dimethoxyethane (10 ml) was added 2M  $\text{Na}_2\text{CO}_3$   
aq. (3.6 ml). The reaction mixture was stirred at 80°C for 2  
hours under  $\text{N}_2$  atmosphere, and poured into ice-water and  
35 extracted with ethyl acetate. The organic layer was washed

with brine, and dried over  $\text{MgSO}_4$ . The solvent was removed under pressure. The residue was subjected to column-chromatography on silica gel 60 (Merk) and eluted with n-hexane/ethyl acetate (80:20). The fractions containing the object compound were combined and evaporated under reduced pressure to give 1-heptyl-4-(4-methoxycarbonylphenyl)pyrazole (0.20 g).

IR (KBr pelet) : 2952, 2920, 2848, 1712, 1610, 1288, 1114, 769  $\text{cm}^{-1}$

NMR ( $\text{DMSO-d}_6$ ,  $\delta$ ) : 0.85 (3H, t,  $J=6.7\text{Hz}$ ), 1.1-1.4 (8H, m), 1.7-1.9 (2H, m), 3.85 (3H, s), 4.11 (2H, t,  $J=7.0\text{Hz}$ ), 7.72 (2H, d,  $J=8.5\text{Hz}$ ), 7.93 (2H, d,  $J=8.5\text{Hz}$ ), 7.99 (1H, s), 8.34 (1H, s)

APCI-MASS :  $m/z = 301$  ( $\text{M}+\text{H}^+$ )

The following compounds (Preparations 262 to 268) were obtained according to a similar manner to that of Preparation 261.

Preparation 262

ethyl 4-[4-(4-n-butyloxyphenyl)phenyl]benzoate

IR (KBr) : 2958, 2935, 2871, 1714, 1602, 1396, 1280, 1108  $\text{cm}^{-1}$

NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 0.99 (3H, t,  $J=7.3\text{Hz}$ ), 1.4-2.0 (7H, m), 4.02 (2H, t,  $J=6.4\text{Hz}$ ), 4.40 (2H, q,  $J=7.1\text{Hz}$ ), 6.98 (2H, d,  $J=6.8\text{Hz}$ ), 7.56 (2H, d,  $J=6.8\text{Hz}$ ), 7.66 (4H, s), 7.68 (2H, d,  $J=8.4\text{Hz}$ ), 8.12 (2H, d,  $J=8.4\text{Hz}$ )

APCI-MASS :  $m/z = 375$  ( $\text{M}+\text{H}^+$ )

Preparation 263

Methyl 6-(4-heptyloxyphenyl)nicotinate

IR (KBr) : 2954, 2859, 1724, 1597, 1288, 1251, 1116, 783  $\text{cm}^{-1}$

NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 0.90 (3H, t,  $J=6.6\text{Hz}$ ), 1.2-1.5 (8H, m)

m), 1.7-1.9 (2H, m), 3.96 (3H, s), 4.03 (2H, t, J=6.5Hz), 7.00 (2H, d, J=8.8Hz), 7.75 (1H, d, J=8.4Hz), 8.02 (1H, d, J=8.8Hz), 8.30 (1H, dd, J=8.4 and 2.2Hz), 9.23 (1H, d, J=2.2Hz)

5      P APCI-MASS : m/z = 328 (M+H<sup>+</sup>)

Preparation 264

CV Methyl 6-[4-(4-n-butyloxyphenyl)phenyl]nicotinate

10      P IR (KBr) : 2956, 2933, 2871, 1724, 1598, 1282, 1118 cm<sup>-1</sup>

15      P NMR (CDCl<sub>3</sub>, δ) : 1.00 (3H, t, J=7.3Hz), 1.4-1.9 (4H, m), 3.98 (3H, s), 4.02 (2H, t, J=6.4Hz), 7.00 (2H, d, J=8.8Hz), 7.59 (2H, d, J=8.8Hz), 7.70 (2H, d, J=8.5Hz), 7.86 (1H, d, J=8.8Hz), 8.13 (2H, d, J=8.5Hz), 8.37 (1H, dd, J=8.8 and 1.6Hz), 9.30 (1H, d, J=1.6Hz)

P APCI-MASS : m/z = 362 (M+H<sup>+</sup>)

Preparation 265

20      CV Methyl 5-[4-(4-n-butyloxyphenyl)phenyl]furan 2-carboxylate

P IR (KBr) : 2958, 2933, 2873, 1716, 1483, 1303, 1139 cm<sup>-1</sup>

25      P NMR (CDCl<sub>3</sub>, δ) : 0.99 (3H, t, J=7.3Hz), 1.5-1.9 (4H, m), 3.93 (3H, s), 4.01 (2H, t, J=6.4Hz), 6.75 (1H, d, J=3.6Hz), 6.98 (2H, d, J=8.7Hz), 7.26 (1H, d, J=3.6Hz), 7.56 (2H, d, J=8.4Hz), 7.61 (2H, d, J=8.7Hz), 7.83 (2H, d, J=8.4Hz)

P APCI-MASS : m/z = 351 (M+H)<sup>+</sup>

30      CV Preparation 266

CV Ethyl 4-[4-[4-(6-methoxyhexyloxy)phenyl]phenyl]benzoate

P IR (KBr) : 2937, 2863, 1712, 1602, 1396, 1278, 1108 cm<sup>-1</sup>

35      P NMR (CDCl<sub>3</sub>, δ) : 1.4-2.0 (11H, m), 3.34 (3H, s), 3.39



(2H, t, J=6.4Hz), 4.01 (2H, t, J=6.4Hz), 4.41 (2H, q, J=7.1Hz), 6.98 (2H, d, J=8.7Hz), 7.56 (2H, d, J=8.7Hz), 7.6-7.8 (6H, m), 8.12 (2H, d, J=8.4Hz)

P APCI-MASS : m/z = 433 (M+H<sup>+</sup>)

5

Preparation 267

4-[4-[4-(5-Methoxypentyloxy)phenyl]phenyl]benzoic acid

P IR (KBr) : 2939, 2859, 1679, 1587, 1396, 1321, 1292, 1126 cm<sup>-1</sup>

10

P NMR (DMSO-d<sub>6</sub>, δ) : 1.3-1.8 (6H, m), 3.21 (3H, s), 3.2-3.4 (2H, m), 4.01 (2H, t, J=6.5Hz), 7.04 (2H, d, J=8.6Hz), 7.66 (2H, d, J=8.6Hz), 7.7-7.9 (6H, m), 8.03 (2H, d, J=8.2Hz)

P APCI-MASS : m/z = 391 (M+H<sup>+</sup>)

15

Preparation 268

Methyl 4-[4-[4-(5-methoxypentyloxy)phenyl]phenyl]phenyl acetate

P IR (KBr) : 2937, 2863, 1739, 1604, 1492, 1255 cm<sup>-1</sup>

20

P NMR (CDCl<sub>3</sub>, δ) : 1.5-2.0 (6H, m), 3.34 (3H, s), 3.42 (2H, t, J=6.3Hz), 3.68 (2H, s), 3.72 (3H, s), 4.02 (2H, t, J=6.4Hz), 6.97 (2H, d, J=8.7Hz), 7.36 (2H, d, J=8.2Hz), 7.5-7.7 (8H, m)

P APCI-MASS : m/z = 419 (M+H<sup>+</sup>)

25

Preparation 269

A solution of 3-[2-(4-Hexylphenylamino)ethyl]-2-oxo-oxazolidine hydrochloride (2.131 g) in 25% hydrobromic acid in acetic acid (13.04 ml) was stirred for 96 hours at ambient temperature. The reaction mixture was pulverized with diisopropyl ether. The precipitate was collected by filtration and added to ethanol (15 ml). The solution was refluxed for 5 hours and pulverized with diisopropyl ether. The precipitate was collected by filtration to give 1-(4-n-Hexylphenyl)piperazine dihydrobromide (2.413 g).

- IR (KBr) : 2921.6, 2711.4, 2485.8, 1452.1, 1012.4  $\text{cm}^{-1}$   
NMR (DMSO- $d_6$ ,  $\delta$ ) : 0.85 (3H, t,  $J=6.6\text{Hz}$ ), 1.1-1.4 (6H, m), 1.4-1.6 (2H, m), 2.49 (2H, t,  $J=8.4\text{Hz}$ ), 3.1-3.4 (8H, m), 6.54 (2H, s), 6.90 (2H, d,  $J=8.7\text{Hz}$ ), 7.08 (2H, d,  $J=8.7\text{Hz}$ ), 8.78 (1H, s)  
APCI-MASS :  $m/z = 247$  ( $M^+ + H$ )

The following compounds (Preparations 270 to 274) were obtained according to a similar manner to that of Preparation 269.

Preparation 270

- 4-[4-(4-n-Hexylphenyl)piperazin-1-yl]benzoic acid dihydrobromide  
IR (KBr) : 2956.3, 1691.3, 1664.3, 1602.6, 1232.3  $\text{cm}^{-1}$   
NMR (DMSO- $d_6$ ,  $\delta$ ) : 0.85 (3H, t,  $J=6.5\text{Hz}$ ), 1.2-1.4 (10H, m), 1.4-1.6 (2H, m), 2.51 (2H, t,  $J=7.4\text{Hz}$ ), 3.2-3.6 (8H, m), 7.0-7.2 (6H, m), 7.81 (2H, d,  $J=8.8\text{Hz}$ )  
APCI-MASS :  $m/z = 367$  ( $M^+ + H$ )

Preparation 271

- 1-(4-Cyclohexylphenyl)piperazine dihydrobromide  
IR (KBr) : 2927.4, 1510.0, 1452.1  $\text{cm}^{-1}$   
NMR (DMSO- $d_6$ ,  $\delta$ ) : 1.1-1.5 (6H, m), 1.6-1.9 (4H, m), 2.41 (1H, m), 3.1-3.4 (8H, m), 6.91 (2H, d,  $J=8.7\text{Hz}$ ), 7.11 (2H, d,  $J=8.7\text{Hz}$ ), 8.78 (1H, s)  
APCI-MASS :  $m/z = 245$  ( $M^+ + H$ )

Preparation 272

- 4-[4-(4-Cyclohexylphenyl)piperazin-1-yl]benzoic acid dihydrobromide  
IR (KBr) : 1668.1, 1602.6, 1230.4, 1189.9  $\text{cm}^{-1}$   
APCI-MASS :  $m/z = 365$  ( $M^+ + H$ )

Preparation 273

3-Fluoro-4-[4-(4-hydroxyphenyl)piperazin-1-yl]benzoic acid dihydrobromide

IR (KBr) : 1708.6, 1610.3  $\text{cm}^{-1}$

NMR (DMSO- $d_6$ ,  $\delta$ ) : 3.2-3.6 (8H, m), 6.81 (2H, d,  $J=8.6\text{Hz}$ ), 7.0-7.4 (3H, m), 7.4-7.8 (2H, m)

APCI-MASS :  $m/z = 317$  ( $M^+ + H$ )

Preparation 274

4-[4-(4-Hydroxyphenyl)piperazin-1-yl]benzoic acid dihydrobromide

IR (KBr) : 1670.1, 1604.5, 1226.5, 775.2  $\text{cm}^{-1}$

NMR (DMSO- $d_6$ ,  $\delta$ ) : 3.0-3.2 (4H, m), 3.3-3.5 (4H, m), 6.68 (2H, d,  $J=8.8\text{Hz}$ ), 6.85 (2H, d,  $J=8.8\text{Hz}$ ), 7.02 (2H, d,  $J=8.8\text{Hz}$ ), 7.79 (2H, d,  $J=8.8\text{Hz}$ ), 8.86 (1H, s), 12.29 (1H, s)

APCI-MASS :  $m/z = 299$  ( $M + H^+$ )

Preparation 275

A mixture of 4-n-hexyloxyaniline (10 g), ethyl acrylate (56.1 ml), glacial acetic acid (19.25 ml), and cuprous chloride (1.02 g) was heated under reflux with stirring under nitrogen for 26 hours. A solution of the cold product in ether was shaken with water and then with aqueous ammonia. The organic layer was taken and dried over magnesium sulfate. The magnesium sulfate was filtered off, and filtrate was evaporated under reduced pressure. The residue was subjected to column chromatography on silica gel and eluted with hexane - ethyl acetate (9:1). The fractions containing the object compound were combined and evaporated under reduced pressure to give Ethyl 3-[N-(2-ethoxycarbonyl)ethyl]-N-(4-hexyloxyphenyl)amino]propionate (15.756 g).

IR (Neat) : 1733.7, 1513.8, 1241.9, 1182.2  $\text{cm}^{-1}$

NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 0.90 (3H, t,  $J=6.5\text{Hz}$ ), 1.2-1.55 (6H, m), 1.24 (6H, t,  $J=7.1\text{Hz}$ ), 1.65-1.85 (2H, m), 2.51

(4H, t, J=7.2Hz), 3.53 (4H, t, J=7.2Hz), 3.89 (2H, t, J=6.5Hz), 4.12 (4H, q, J=7.1Hz), 6.72 (2H, d, J=9.3Hz), 6.83 (2H, d, J=9.3Hz)

⌈ APCI-MASS : m/z = 394 (M<sup>+</sup>+H)

5

CL Preparation 276

A suspension of methyl 4-formylbenzoate (4.92 g), hydroxylamine hydrochloride (5.21 g) and sodium acetate (6.15 g) in ethanol (50 ml) was refluxed for 2 hours. The mixture was poured into water and extracted with ethyl acetate and the separated organic layer was washed with brine and dried over magnesium sulfate. The solvents were removed under reduced pressure to give 4-methoxycarbonylbenzaldehyde oxime (5.28 g).

15 ⌈ IR (KBr) : 3291, 1727, 1438, 1284, 1112 cm<sup>-1</sup>

⌈ NMR (CDCl<sub>3</sub>, δ) : 3.93 (3H, s), 7.65 (2H, d, J=8.3Hz), 8.10 (2H, d, J=8.3Hz), 8.18 (1H, s), 8.27 (1H, s)

⌈ APCI-MASS : m/z = 180

20 The following compound was obtained according to a similar manner to that of Preparation 276.

CL Preparation 277

CL N-Hydroxy-4-n-hexyloxybenzamidine

25 ⌈ IR (KBr) : 3446, 3349, 2937, 2865, 1650, 1610, 1519, 1392, 1253 cm<sup>-1</sup>

⌈ NMR (DMSO-d<sub>6</sub>, δ) : 0.88 (3H, t, J=6.4Hz), 1.2-1.8 (8H, m), 3.97 (2H, t, J=6.5Hz), 5.70 (2H, s), 6.90 (2H, d, J=8.4Hz), 7.58 (2H, d, J=8.4Hz), 9.43 (1H, s)

30 ⌈ APCI-MASS : m/z = 237 (M+H)<sup>+</sup>

CL Preparation 278

To a solution of 4-methoxycarbonylbenzaldehyde oxime (896 mg) in N,N-dimethylformamide (10 ml) was added 4N-hydrochloride acid in 1,4-dioxane (1.38 ml) and oxone<sup>R</sup> (1.69

g). The suspension was stirred at ambient temperature for 16 hours and poured into ice-water. The object compound was extracted with ethyl acetate and the organic layer was washed with brine, dried over magnesium sulfate. The solvents were removed under reduced pressure to give 4-Methoxycarbonylbenzaldehyde oxime chloride (1.05 g).

IR (KBr) : 3390, 1710, 1436, 1405, 1284, 1232, 1116, 1016  $\text{cm}^{-1}$

NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 3.95 (3H, s), 8.93 (2H, d,  $J=8.3\text{Hz}$ ), 8.10 (2H, d,  $J=8.7\text{Hz}$ ), 8.39 (1H, s)

APCI-MASS :  $m/z = 176$  ( $\text{M-H}^+-\text{HCl}$ )

Preparation 279

A solution of Ethyl 4-oxo-1-(4-n-hexyloxyphenyl)piperidine-3-carboxylate (1.437 g) in 20% hydrochloric acid (7.2 ml) was refluxed for 2 hours, cooled, basified with 60% aqueous sodium hydroxide, and extracted with ethyl acetate. The organic layer was taken and dried over magnesium sulfate. The magnesium sulfate was filtered off, and filtrate was evaporated under reduced pressure to give 1-(4-n-Hexyloxyphenyl)-4-piperidone (0.959 g).

IR (Neat) : 2931.3, 1716.3, 1511.9, 1243.9, 825.4  $\text{cm}^{-1}$

NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 0.90 (3H, t,  $J=6.5\text{Hz}$ ), 1.2-1.6 (6H, m), 1.65-1.85 (2H, m), 2.57 (4H, t,  $J=6.1\text{Hz}$ ), 3.46 (4H, t,  $J=6.1\text{Hz}$ ), 3.92 (2H, t,  $J=6.5\text{Hz}$ ), 6.85 (2H, d,  $J=9.3\text{Hz}$ ), 6.95 (2H, d,  $J=9.3\text{Hz}$ )

APCI-MASS :  $m/z = 276$  ( $\text{M}^++\text{H}$ )

Preparation 280

A solution of 4-[4-(7-Bromoheptyloxy)phenyl]bromobenzene (0.25 g) in a solution of tetra n-butylammonium fluoride (tetrahydrofuran solution, 1M, 2.9 ml) was heated to 50°C for 2 hours. After cooling to ambient temperature, the solution was taken up into a mixture of ethyl acetate (20 ml) and water (20 ml). The separated organic layer was washed with

water, brine, and dried over magnesium sulfate. Evaporation gave a residue which was chromatographed on silica gel (30 ml) eluting with a mixture of n-hexane and ethyl acetate (100:0-97:3, V/V). The fractions which contained the objective compound were collected and evaporated a residue which was triturated with n-hexane to give 4-[4-(7-Fluoroheptyloxy)phenyl]bromobenzene (104 mg).

IR (KBr) : 2937.1, 2859.9, 1606.4  $\text{cm}^{-1}$

<sup>1</sup>H NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 1.20-1.90 (10H, m), 3.99 (2H, t; J=6.4Hz), 4.45 (2H, dt, J=47.3 and 6.1Hz), 6.95 (2H, d, J=6.7Hz), 7.40 (2H, d, J=6.7Hz), 7.47 (2H, d, J=6.7Hz), 7.52 (2H, d, J=6.7Hz)

The following compound was obtained according to a similar manner to that of Preparation 280.

Preparation 281

4-[4-(6-Fluorohexyloxy)phenyl]bromobenzene

<sup>1</sup>H NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 1.40-1.95 (8H, m), 4.01 (2H, t, J=6.4Hz), 4.47 (2H, dt, J=47.5 and 6.0Hz), 6.95 (2H, d, J=8.6Hz), 7.35-7.59 (6H, m)

Preparation 282

A solution of 4-[4-(8-Bromooctyloxy)phenyl]bromobenzene (3.7 g) in a mixture of sodium methoxide (4.9M in methanol, 17 ml), N,N-dimethylformamide (20 ml) and tetrahydrofuran (8 ml) was heated to 80°C for 3 hours. The reaction mixture was taken up into a mixture of ethyl acetate (200 ml) and water (100 ml). The separated organic layer was washed in turn with water, brine, dried over magnesium sulfate. Evaporation gave a residue which was subjected to column chromatography (silica gel, 100 ml) eluting with n-hexane to give 4-[4-(8-Methoxyoctyloxy)phenyl]bromobenzene (2.73 g).

IR (KBr) : 2935.1, 2858.0, 1604.5  $\text{cm}^{-1}$

<sup>1</sup>H NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 1.25-1.70 (10H, m), 1.70-1.95 (2H,

m), 3.33 (3H, s), 3.37 (2H, t, J=6.5Hz), 3.99 (2H, t, J=6.5Hz), 6.95 (2H, d, J=8.8Hz), 7.35-7.66 (6H, m)

APCI-MASS :  $m/z = 391 (M^+)$

5

The following compounds (Preparations 283 to 284) were obtained according to a similar manner to that of Preparation 282.

10 Preparation 283

4-[4-(6-Methoxyhexyloxy)phenyl]bromobenzene

NMR (CDCl<sub>3</sub>,  $\delta$ ) : 1.50-1.70 (6H, m), 1.70-1.95 (2H, m), 3.34 (3H, s), 3.40 (2H, t, J=6.2Hz), 3.99 (2H, t, J=6.5Hz), 6.95 (2H, d, J=8.7Hz), 7.30-7.60 (6H, m)

APCI-MASS :  $m/z = 365 (M^+ + 2)$

Preparation 284

4-[4-(7-Methoxyheptyloxy)phenyl]bromobenzene

IR (KBr) : 2935.1, 2854.1, 1604.5 cm<sup>-1</sup>

NMR (CDCl<sub>3</sub>,  $\delta$ ) : 1.25-1.70 (8H, m), 1.70-1.95 (2H, m), 3.33 (3H, s), 3.37 (2H, t, J=6.4Hz), 3.98 (2H, t, J=6.5Hz), 6.95 (2H, d, J=8.8Hz), 7.35-7.56 (6H, m)

APCI-MASS :  $m/z = 379 (M^+ + 2)$

25 Preparation 285

N-(4-octylphenyl)-N'-aminourea, Formamidine acetate (12.76 g) and N-carbazoyl-4-octylaniline (6.458 g) in N,N-dimethylformamide (19.4 ml) were stirred at 150°C for 6 hours. The reaction mixture was pulverized with water. The precipitate was collected by filtration and washed with water to give 4-(4-Octylphenyl)-2,3-dihydro-4H-1,2,4-triazol-3-one (4.27 g).

IR (KBr) : 3214.8, 3085.5, 1704.8 cm<sup>-1</sup>

NMR (CDCl<sub>3</sub>,  $\delta$ ) : 0.88 (3H, t, J=6.7Hz), 1.2-1.5 (10H, m), 1.5-1.8 (2H, m), 2.64 (2H, t, J=7.9Hz), 7.29

35

(2H, d, J=8.5Hz), 7.43 (2H, d, J=8.5Hz), 7.67 (1H, d, J=1.3Hz), 10.31 (1H, s)

APCI-MASS : m/z = 274 (M+H<sup>+</sup>)

5 The following compound (Preparation 286) was obtained according to a similar manner to that of Preparation 285.

CL Preparation 286

CL 4-[4-(4-tert-Butoxycarbonylpiperazin-1-yl)phenyl]-2,3-dihydro-4H-1,2,4-triazol-3-one

IR (KBr) : 3200, 1699.0, 918.0 cm<sup>-1</sup>

NMR (CDCl<sub>3</sub>, δ) : 1.49 (9H, s), 3.17 (4H, t, J=4.9Hz), 3.60 (4H, t, J=4.9Hz), 7.00 (2H, d, J=9.0Hz), 7.40 (2H, d, J=9.0Hz), 7.63 (1H, s), 10.4 (1H, s)

APCI-MASS : m/z = 346 (M+H<sup>+</sup>)

CL Preparation 287

A mixture of Methyl 6-(1-heptynyl)naphthalene-2-carboxylate (4.51 g) and platinum oxide (0.4 g) in tetrahydrofuran was stirred under 3.5 atm pressure of hydrogen for 5 hours. The catalyst was filtered off and the filtrate was evaporated to give Methyl 6-heptylnaphthalene-2-carboxylate (4.40 g).

NMR (CDCl<sub>3</sub>, δ) : 0.88 (3H, t, J=6.6Hz), 1.16-1.50 (8H, m), 1.50-1.80 (2H, m), 2.78 (2H, t, J=7.6Hz), 3.97 (3H, s), 7.39 (1H, dd, J=17 and 8.4Hz), 7.64 (1H, s), 7.79 (1H, d, J=8.6Hz), 7.86 (1H, d, J=8.4Hz), 8.02 (1H, dd, J=1.7 and 8.6Hz), 8.57 (1H, s)

APCI-MASS : m/z = 285 (M<sup>+</sup>+1)

30

The following compound (Preparation 288) was obtained according to a similar manner to that of Preparation 287.

CL Preparation 288

CL Methyl 6-hexylnaphthalene-2-carboxylate



1 NMR (CDCl<sub>3</sub>,  $\delta$ ) : 0.88 (3H, t, J=6.8Hz), 1.17-1.53 (6H, m), 1.60-1.82 (2H, m), 2.79 (2H, t, J=7.7Hz), 3.97 (3H, s), 7.39 (1H, dd, J=1.7 and 8.4Hz), 7.64 (1H, s), 7.80 (1H, d, J=8.6Hz), 7.86 (1H, d, J=8.4Hz),  
5 8.03 (1H, dd, J=1.7 and 8.6Hz), 8.57 (1H, s)  
1 APCI-MASS : m/z = 271 (M+1)

✓ Preparation 289

To a stirred solution of Methyl 6-hydroxynaphthalene-2-carboxylate (3.0 g) in dichloromethane (40 ml) were added in  
10 turn diisopropylethylamine (3.9 ml) and triflic anhydride (3.0 ml) at -40°C. After stirring at -40°C for 20 minutes, the mixture was taken up into a mixture of ethyl acetate and cold water. The organic layer was separated, washed with  
15 brine, dried over magnesium sulfate, and dried in vacuo. The residue was taken up into piperidine (20 ml) and to the solution were added 1-heptyne (4.0 ml) and tetrakis(triphenylphosphine)palladium(0) (0.5 g). After heating to 85°C for 1 hour under nitrogen atmosphere, the  
20 reaction mixture was evaporated in vacuo. The residue was diluted with ethyl acetate, and the solution was washed in turn with hydrochloric acid and brine, dried over magnesium sulfate and evaporated in vacuo. The residue was chromatographed on silica gel (200 ml) eluting with a mixture  
25 of n-hexane and ethyl acetate (9:1, V/V) to give Methyl 6-(1-heptynyl)naphthalene-2-carboxylate (4.01 g).

1 NMR (CDCl<sub>3</sub>,  $\delta$ ) : 0.94 (3H, t, J=7.1Hz), 1.30-1.70 (6H, m), 2.46 (2H, t, J=7.0Hz), 3.97 (3H, s), 7.50 (1H, dd, J=1.7 and 8.6Hz), 7.80 (1H, d, J=8.6Hz), 7.86  
30 (1H, d, J=8.6Hz), 8.04 (1H, dd, J=1.7 and 8.6Hz), 8.55 (1H, s)

1 APCI-MASS : m/z = 281 (M<sup>+</sup>+1)

The following compound was obtained according to a  
35 similar manner to that of Preparation 289.

CL Preparation 290

CL Methyl 6-(1-hexynyl)naphthalene-2-carboxylate

5 P NMR (CDCl<sub>3</sub>,  $\delta$ ) : 0.97 (3H, t, J=7.1Hz), 1.40-1.71 (4H, m), 2.47 (2H, t, J=6.8Hz), 3.98 (3H, s), 7.50 (1H, dd, J=1.5 and 8.5Hz), 7.79 (1H, d, J=8.6Hz), 7.85 (1H, d, J=8.5Hz), 7.92 (1H, s), 8.04 (1H, dd, J=1.7 and 8.6Hz), 8.55 (1H, s)  
P APCI-MASS : m/z = 267 (M<sup>+</sup>+1)

10 CL Preparation 291

To a solution of 4-octylaniline (5 ml) in a mixture of pyridine (12.5 ml) and chloroform (40 ml) was added phenyl chloroformate (2.95 ml) and stirred for 1.5 hours at ambient temperature. The reaction mixture was added to a mixture of 15 water and ethyl acetate. The organic layer was taken and dried over magnesium sulfate. The magnesium sulfate was filtered off, and the filtrate was evaporated under reduced pressure to give 4-Octyl-N-phenoxy carbonylaniline (4.51 g)

P IR (KBr) : 3318.9, 1714.4, 1234.2 cm<sup>-1</sup>  
20 P NMR (CDCl<sub>3</sub>,  $\delta$ ) : 0.88 (3H, t, J=6.2Hz), 1.2-1.4 (10H, m), 1.5-1.7 (2H, m), 2.57 (2H, t, J=7.3Hz), 6.88 (1H, s), 7.1-7.5 (9H, m)

The following compounds (Preparations 292 to 299) were 25 obtained according to a similar manner to that of Preparation 291.

CL Preparation 292

CL 4-(4-tert-Butoxycarbonylpiperazin-1-yl)-N- 30 phenoxy carbonylaniline

P IR (KBr) : 3309.2, 1743.3, 1658.5, 1197.6 cm<sup>-1</sup>  
P NMR (CDCl<sub>3</sub>,  $\delta$ ) : 1.48 (9H, s), 3.08 (4H, t, J=5.3Hz), 3.58 (4H, t, J=5.3Hz), 6.87 (1H, s), 6.91 (2H, d, J=9Hz), 7.1-7.5 (7H, m)  
35 P APCI-MASS : m/z = 398 (M+H<sup>+</sup>)

CL Preparation 293

CL 1-(4-Cyclohexylbenzoyl)-2-(4-methoxycarbonylbenzoyl)-hydrazine

IR (KBr) : 3236, 2925, 2852, 1726, 1679, 1637, 1278, 1110  $\text{cm}^{-1}$

NMR (DMSO- $\text{d}_6$ ,  $\delta$ ) : 1.1-1.5 (5H, m), 1.6-2.0 (5H, m), 2.60 (1H, m), 3.90 (3H, s), 7.37 (2H, d,  $J=8.0\text{Hz}$ ), 7.85 (2H, d,  $J=8.0\text{Hz}$ ), 8.0-8.2 (4H, m), 10.48 (1H, s), 10.68 (1H, s)

APCI-MASS :  $m/z = 381$  (M+H) $^{+}$

CL Preparation 294

CL 1-[4-(Piperidin-1-yl)benzoyl]-2-(4-methoxycarbonylbenzoyl)hydrazine

IR (KBr) : 3500, 3286, 2941, 2854, 1712, 1689, 1650, 1606, 1286, 1242  $\text{cm}^{-1}$

NMR (DMSO- $\text{d}_6$ ,  $\delta$ ) : 1.59 (6H, s), 3.33 (4H, s), 3.90 (3H, s), 6.97 (2H, d,  $J=8.8\text{Hz}$ ), 7.79 (2H, d,  $J=8.8\text{Hz}$ ), 8.02 (2H, d,  $J=8.4\text{Hz}$ ), 8.09 (2H, d,  $J=8.4\text{Hz}$ ), 10.23 (1H, s), 10.57 (1H, s)

APCI-MASS :  $m/z = 382$  (M+H) $^{+}$

CL Preparation 295

CL 1-[4-(4-n-Propyloxyphenyl)benzoyl]-2-(4-methoxycarbonylbenzoyl)hydrazine

IR (KBr) : 3230, 1724, 1679, 1654, 1280, 1108  $\text{cm}^{-1}$

NMR (DMSO- $\text{d}_6$ ,  $\delta$ ) : 1.00 (3H, d,  $J=7.5\text{Hz}$ ), 1.76 (2H, tq,  $J=6.5$  and  $7.5\text{Hz}$ ), 3.91 (3H, s), 7.05 (2H, d,  $J=8.7\text{Hz}$ ), 7.71 (2H, d,  $J=8.7\text{Hz}$ ), 7.79 (2H, d,  $J=8.5\text{Hz}$ ), 8.00 (2H, d,  $J=8.5\text{Hz}$ ), 8.05 (2H, d,  $J=8.6\text{Hz}$ ), 8.11 (2H, d,  $J=8.6\text{Hz}$ ), 10.60 (1H, s), 10.72 (1H, s)

APCI-MASS :  $m/z = 433$  (M+H) $^{+}$

CL Preparation 296

CL 1-(4-Methoxycarbonylbenzoyl)-2-decanoylhydrazine

IR (KBr) : 3220, 2919, 2850, 1724, 1643, 1600, 1567,  
1479, 1284  $\text{cm}^{-1}$

5 NMR (DMSO- $\text{d}_6$ ,  $\delta$ ) : 0.86 (3H, t,  $J=6.8\text{Hz}$ ), 1.2-1.7  
(14H, m), 2.18 (2H, t,  $J=7.4\text{Hz}$ ), 3.89 (3H, s), 7.97  
(2H, d,  $J=8.5\text{Hz}$ ), 8.06 (2H, d,  $J=8.5\text{Hz}$ ), 9.15 (1H,  
s), 10.49 (1H, s)

APCI-MASS :  $m/z = 349$  ( $\text{M}+\text{H}^+$ )

10 CL Preparation 297

CL 1-(4-Methoxycarbonylbenzoyl)-2-(trans-4-n-  
pentylcyclohexylcarbonyl)hydrazine

IR (KBr) : 3201, 2923, 2852, 1727, 1600, 1567, 1479,  
1282  $\text{cm}^{-1}$

15 NMR (DMSO- $\text{d}_6$ ,  $\delta$ ) : 0.86 (3H, t,  $J=6.9\text{Hz}$ ), 0.9-1.0 (2H,  
m), 1.1-1.5 (11H, m), 1.7-1.9 (4H, m), 2.20 (1H,  
m), 3.88 (3H, s), 7.97 (2H, d,  $J=8.6\text{Hz}$ ), 8.06 (2H,  
d,  $J=8.6\text{Hz}$ ), 9.85 (1H, s), 10.46 (1H, s)

APCI-MASS :  $m/z = 375$  ( $\text{M}+\text{H}^+$ )

20 CL Preparation 298

CL 1-[4-(8-Methoxyoctyloxy)benzoyl]-2-(4-  
methoxycarbonylbenzoyl)hydrazine

IR (KBr) : 3213, 2935, 2856, 1718, 1600, 1567, 1465,  
1282  $\text{cm}^{-1}$

25 NMR (DMSO- $\text{d}_6$ ,  $\delta$ ) : 1.2-1.8 (12H, m), 3.21 (3H, s),  
3.29 (2H, t,  $J=6.4\text{Hz}$ ), 3.90 (3H, s), 4.04 (2H, t,  
 $J=6.5\text{Hz}$ ), 7.04 (2H, d,  $J=8.8\text{Hz}$ ), 7.90 (2H, d,  
 $J=8.8\text{Hz}$ ), 8.04 (2H, d,  $J=8.7\text{Hz}$ ), 8.10 (2H, d,  
 $J=8.7\text{Hz}$ ), 10.41 (1H, s), 10.64 (1H, s)

30 APCI-MASS :  $m/z = 457$  ( $\text{M}+\text{H}^+$ )

CL Preparation 299

CL 1-(4-Octyloxybenzoyl)-2-(4-methoxycarbonylbenzoyl)-  
35 hydrazine

IR (KBr) : 3224, 2923, 2854, 1724, 1681, 1643, 1502,  
1434, 1282, 1253, 1106  $\text{cm}^{-1}$

NMR (DMSO- $\text{d}_6$ ,  $\delta$ ) : 0.86 (3H, t,  $J=6.8\text{Hz}$ ), 1.2-1.5  
(10H, m), 1.6-1.8 (2H, m), 3.89 (3H, s), 4.04 (2H,  
t,  $J=6.3\text{Hz}$ ), 7.04 (2H, d,  $J=8.7\text{Hz}$ ), 7.90 (2H, d,  
 $J=8.7\text{Hz}$ ), 8.03 (2H, d,  $J=8.6\text{Hz}$ ), 8.10 (2H, d,  
 $J=8.6\text{Hz}$ ), 10.42 (1H, s), 10.64 (1H, s)

APCI-MASS :  $m/z = 427$  ( $\text{M}+\text{H}^+$ )

10 Preparation 300

A solution of Methyl 4-n-hexyloxybenzoate (2.00 g) and hydrazine hydrate (4.24 g) in ethanol (10 ml) was refluxed for 6 hours. After cooling, the reaction mixture was poured into water. The precipitate was collected by filtration, washed with water and dried over  $\text{P}_2\text{O}_5$  under reduced pressure to give N-(4-n-hexyloxybenzoyl)hydrazine (1.96 g).

IR (KBr) : 3311, 2954, 2869, 1623, 1253  $\text{cm}^{-1}$

NMR (DMSO- $\text{d}_6$ ,  $\delta$ ) : 0.87 (3H, t,  $J=6.8\text{Hz}$ ), 1.2-1.5 (6H, m), 1.6-1.8 (2H, m), 4.00 (2H, t,  $J=6.5\text{Hz}$ ), 4.40 (2H, s), 6.95 (2H, d,  $J=8.6\text{Hz}$ ), 7.77 (2H, d,  $J=8.6\text{Hz}$ ), 9.59 (1H, s)

APCI-MASS :  $m/z = 237$  ( $\text{M}+\text{H}^+$ )

The following compounds (Preparations 301 to 308) were obtained according to a similar manner to that of Preparation 300.

Preparation 301

N-(4-Octylphenyl)-N'-aminourea

IR (KBr) : 3309.2, 1683.6, 1554.3  $\text{cm}^{-1}$

NMR (DMSO- $\text{d}_6$ ,  $\delta$ ) : 0.85 (3H, t,  $J=6.7\text{Hz}$ ), 1.1-1.4 (10H, m), 1.4-1.6 (2H, m), 2.48 (2H, t,  $J=8.9\text{Hz}$ ), 4.32 (2H, s), 7.03 (2H, d,  $J=8.4\text{Hz}$ ), 7.32 (1H, s), 7.38 (2H, d,  $J=8.4\text{Hz}$ ), 8.50 (1H, s)

CL Preparation 302

CL N-[4-(4-tert-Butoxycarbonylpiperazin-1-yl)phenyl]-N'-aminourea

- P IR (KBr) : 3237.9, 1695.1, 1670.1, 1540.8, 1230.4  $\text{cm}^{-1}$   
5 P NMR (DMSO- $\text{d}_6$ ,  $\delta$ ) : 1.42 (9H, s), 2.97 (4H, t,  $J=4.9\text{Hz}$ ), 3.44 (4H, t,  $J=4.9\text{Hz}$ ), 4.30 (2H, s), 6.85 (2H, d,  $J=9.0\text{Hz}$ ), 7.26 (1H, s), 7.36 (2H, d,  $J=9.0\text{Hz}$ ), 8.41 (1H, s)

10 CL Preparation 303

CL 4-Cyclohexylbenzoylhydrazine

- P IR (KBr) : 3318, 2925, 2852, 1625, 1606, 1527, 1326  $\text{cm}^{-1}$   
15 P NMR (DMSO- $\text{d}_6$ ,  $\delta$ ) : 1.1-1.5 (5H, m), 1.6-2.0 (5H, m), 2.4-2.6 (1H, m), 4.44 (2H, s), 7.27 (2H, d,  $J=8.2\text{Hz}$ ), 7.73 (2H, d,  $J=8.2\text{Hz}$ ), 9.66 (1H, s)  
P APCI-MASS :  $m/z = 219$  ( $M+H$ )<sup>+</sup>

CL Preparation 304

20 CL 4-(Piperidin-1-yl)benzoylhydrazine

- P IR (KBr) : 3263, 2852, 1612, 1504, 1245, 1124  $\text{cm}^{-1}$   
P NMR (DMSO- $\text{d}_6$ ,  $\delta$ ) : 1.57 (6H, s), 3.25 (4H, s), 4.35 (2H, s), 6.90 (2H, d,  $J=9.0\text{Hz}$ ), 7.68 (2H, d,  $J=9.0\text{Hz}$ ), 9.44 (1H, s)  
25 P APCI-MASS :  $m/z = 220$  ( $M+H$ )<sup>+</sup>

CL Preparation 305

CL 4-(4-n-Propyloxyphenyl)benzoylhydrazine

- P IR (KBr) : 3350, 3276, 1610, 1494, 1288, 978  $\text{cm}^{-1}$   
30 P NMR (DMSO- $\text{d}_3$ ,  $\delta$ ) : 0.99 (3H, t,  $J=7.5\text{Hz}$ ), 1.75 (2H, tq,  $J=6.5$  and  $7.5\text{Hz}$ ), 3.98 (2H, t,  $J=6.5\text{Hz}$ ), 4.50 (2H, s), 7.03 (2H, d,  $J=8.8\text{Hz}$ ), 7.65 (2H, d,  $J=8.8\text{Hz}$ ), 7.69 (2H, d,  $J=8.4\text{Hz}$ ), 7.88 (2H, d,  $J=8.4\text{Hz}$ ), 9.79 (1H, s)  
35 P APCI-MASS :  $m/z = 271$  ( $M+H$ )<sup>+</sup>

CL Preparation 306

CL 4-Methoxycarbonylbenzoylhydrazine

P IR (KBr) : 3322, 3250, 3018, 1727, 1658, 1621, 1565,  
1432, 1280, 1110  $\text{cm}^{-1}$

5 P NMR (DMSO- $d_6$ ,  $\delta$ ) : 3.87 (3H, s), 4.58 (2H, s), 7.93  
(2H, dd,  $J=8.6$  and  $3.1\text{Hz}$ ), 7.02 (2H, dd,  $J=8.6$  and  
 $3.1\text{Hz}$ ), 9.97 (1H, s)

P APCI-MASS :  $m/z = 195$  ( $M+H^+$ )

10 CL Preparation 307

CL Trans-4-n-pentylcyclohexylcarbonylhydrazine

P IR (KBr) : 3303, 3199, 2954, 2925, 2850, 1639, 1619,  
1533, 1457  $\text{cm}^{-1}$

15 P NMR (DMSO- $d_6$ ,  $\delta$ ) : 0.8-1.0 (6H, m), 1.1-1.5 (10H, m),  
1.6-2.2 (5H, m), 4.10 (2H, s), 8.85 (1H, s)

P APCI-MASS :  $m/z = 213$  ( $M+H^+$ )

CL Preparation 308

CL 4-(8-Methoxyoctyloxy)benzoylhydrazine

20 P IR (KBr) : 3309, 2937, 2852, 1606, 1494, 1253  $\text{cm}^{-1}$

P NMR (DMSO- $d_6$ ,  $\delta$ ) : 1.2-1.8 (12H, m), 3.20 (3H, s),  
3.25 (2H, t,  $J=6.5\text{Hz}$ ), 3.99 (2H, t,  $J=6.5\text{Hz}$ ), 4.39  
(2H, s), 6.95 (2H, d,  $J=8.8\text{Hz}$ ), 7.77 (2H, d,  
 $J=8.8\text{Hz}$ ), 9.58 (1H, s)

25 P APCI-MASS :  $m/z = 295$  ( $M+H$ )<sup>+</sup>

CL Preparation 309

30 To a stirred solution of 4-bromo-4'-n-heptylbiphenyl  
(2.71 g) in tetrahydrofuran (100 ml) was added dropwise a  
solution of n-butyllithium in a mixture of diethyl ether and  
n-hexane (1.6M, 5.1 ml) at  $-78^\circ\text{C}$ . After stirring at  $-78^\circ\text{C}$   
for 30 minutes, the resultant mixture was added to a solution  
of diethyl oxalate (3.4 ml) in tetrahydrofuran (50 ml) at  
-78 $^\circ\text{C}$ . The resultant mixture was allowed to warm to  $0^\circ\text{C}$  for  
35 about 1 hour, and to the mixture was added acetic acid (0.5

ml). Evaporation gave a residue which was taken up into a mixture of water and ethyl acetate. The organic layer was separated, washed with brine, dried over magnesium sulfate. Evaporation gave a residue which was chromatographed on silica gel (200 ml) eluting with a mixture of n-hexane and ethyl acetate (10:0-95:5, V/V) to give 1-Ethyl-2-(4-n heptylphenyl)ethanedione (2.23 g).

10  $\delta$  NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 0.88 (3H, t,  $J=6.6\text{Hz}$ ), 1.10-1.50 (8H, m), 1.44 (3H, t,  $J=7.1\text{Hz}$ ), 1.50-1.80 (2H, m), 2.66 (2H, t,  $J=7.7\text{Hz}$ ), 4.47 (2H, q,  $J=7.1\text{Hz}$ ), 7.20-7.40 (2H, m), 7.50-7.64 (2H, m), 7.64-7.85 (2H, m), 8.00-8.20 (2H, m)

$\delta$  APCI-MASS :  $m/z = 353 (M^++1)$

15 Preparation 310

To a suspension of sodium hydride (60% in oil, 0.37 g) in tetrahydrofuran (40 ml) was added by portions 4-acetyl-4'-n-heptylbiphenyl (2.50 g) at ambient temperature. After stirring at ambient temperature for 1 hour, to the solution was added triethyl phosphonoacetate (1.9 ml) and the mixture was heated to reflux for 5 hours. After cooling to ambient temperature, to the mixture was added acetic acid (0.53 ml) and evaporated. The residue was taken up into a mixture of water and ethyl acetate. The separated organic layer was washed with brine, dried over magnesium sulfate and evaporated. The residue was chromatographed on silica gel (200 ml) eluting with mixture of n-hexane and diisopropyl ether (99:1-20:1, V/V) to give Ethyl (E)-3-[4-(4-heptylphenyl)phenyl]-2-butenate (2.19 g).

30  $\delta$  NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 0.88 (3H, t,  $J=6.6\text{Hz}$ ), 1.13-1.48 (8H, m), 1.48-1.78 (2H, m), 2.61 (3H, s), 2.65 (2H, t;  $J=7.4\text{Hz}$ ), 4.22 (2H, q,  $J=7.1\text{Hz}$ ), 6.20 (1H, t,  $J=2.7\text{Hz}$ ), 7.23-7.28 (2H, m), 7.50-7.63 (6H, m)

$\delta$  APCI-MASS :  $m/z = 365 (M^++1)$



Preparation 311

To a solution of 4-bromo-4'-n-heptylbiphenyl (5.1 g) in tetrahydrofuran (60 ml) was added a solution of n-butyllithium in a mixture of n-hexane and diethyl ether (1.6M, 9.7 ml) at -60°C. After stirring at -60°C for 30 minutes, to the mixture was added N,N-dimethylacetamide (4.3 ml) and the reaction mixture was allowed to warm to 0°C. The reaction mixture was taken up into a mixture of cold water and ethyl acetate, and the pH was adjusted to around 1 with 1N hydrochloric acid. The organic layer was separated, washed with brine, dried over magnesium sulfate and evaporated. The residue was chromatographed on silica gel (150 ml) eluting with a mixture of n-hexane and ethyl acetate (20:1, V/V) to give 4-Acetyl-4'-n-heptylbiphenyl (1.60 g).

$\delta$  NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 0.89 (3H, t,  $J=6.6\text{Hz}$ ), 1.05-1.48 (8H, m), 1.48-1.75 (2H, m), 2.65 (2H, t,  $J=7.6\text{Hz}$ ), 2.63 (3H, s), 7.20-7.31 (2H, m), 7.52-7.58 (2H, m), 7.65-7.70 (2H, m), 7.97-8.05 (2H, m)

$\delta$  APCI-MASS :  $m/z = 295 (M+1)$

Preparation 312

To a solution of Methyl 4-[4-(8-hydroxyoctyloxy)phenyl]-benzoate (500 mg) and dihydropyran (141 mg) in dichloromethane (15 ml) was added p-toluenesulfonic acid (5 ml). The mixture was stirred at ambient temperature for 10 minutes and diluted with dichloromethane and washed with water and brine. The separated organic layer was dried over magnesium sulfate and evaporated under reduced pressure to give Methyl 4-[4-(8-tetrahydropyran-2-yl-oxyoctyloxy)phenyl]-benzoate (616 mg).

$\delta$  IR (KBr) : 2935, 2856, 1722, 1602, 1438, 1290, 1199  $\text{cm}^{-1}$

$\delta$  NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 1.3-2.0 (18H, m), 3.3-3.9 (4H, m), 3.93 (3H, s), 4.00 (2H, t,  $J=6.5\text{Hz}$ ), 4.5-4.6 (1H, m), 6.98 (2H, d,  $J=8.7\text{Hz}$ ), 7.56 (2H, d,  $J=8.7\text{Hz}$ ),

7.62 (2H, d, J=8.3Hz), 8.07 (2H, d, J=8.3Hz)

✓ Preparation 313

To a solution of titanium(IV) chloride (11.6 g) in  
5 dichloromethane (100 ml) was added 4-n-Pentyloxyacetophenone  
(10.3 g) and Methyl 4-formylbenzoate (8.21 g) in  
dichloromethane (50 ml) dropwise at 0°C. To the mixture was  
added triethylamine (11.15 ml) in dichloromethane (30 ml).  
10 The mixture was stirred at 0°C for 30 minutes and diluted  
with n-hexane. The organic layer was washed with water (four  
times), brine and dried over magnesium sulfate. The solvents  
were removed under reduced pressure and the residue was  
triturated with iso-propyl ether. The solid was collected by  
15 filtration and dried to give 1-(4-Methoxycarbonylphenyl)-3-  
(4-n-pentyloxyphenyl)-1-propen-3-one (4.02 g).

IR (KBr) : 2950, 2910, 2863, 1718, 1654, 1606, 1274,  
1176 cm<sup>-1</sup>

1 NMR (CDCl<sub>3</sub>, δ) : 0.94 (3H, t, J=6.9Hz), 1.3-1.6 (4H,  
m), 1.8-2.0 (2H, m), 3.93 (3H, s), 4.04 (2H, t,  
20 J=6.5Hz), 6.97 (2H, d, J=8.8Hz), 7.60 (1H, d,  
J=15.7Hz), 7.68 (2H, d, J=8.4Hz), 7.80 (1H, d,  
J=15.7Hz), 8.0-8.2 (4H, m)

APCI-MASS : m/z = 353 (M+H<sup>+</sup>)

25 ✓ Preparation 314

To a solution of titanium(IV) chloride (13.88 g) in  
dichloromethane (100 ml) was added Ethyl 4-acetylbenzoate  
(11.53 g) and 4-n-pentyloxybenzaldehyde (12.69 g) in  
dichloromethane (50 ml) was added dropwise at 0°C. To the  
30 mixture was added triethylamine (12.44 ml) in dichloromethane  
(30 ml). The mixture was stirred at 0°C for 30 minutes and  
diluted with ethyl acetate. The organic layer was washed  
with water (four times) and brine and dried over magnesium  
sulfate. The solvents were removed under reduced pressure  
35 and the residue was triturated with n-hexane. The solid was

collected by filtration and dried to give 1-(4-n-Pentyloxyphenyl)-3-(4-ethoxycarbonylphenyl)-1-propen-3-one (13.45 g).

- 5  $\rho$  IR (KBr) : 2956, 2929, 2861, 1718, 1656, 1594, 1510, 1272  $\text{cm}^{-1}$
- $\rho$  NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 0.94 (3H, t,  $J=7.1\text{Hz}$ ), 1.3-1.9 (9H, m), 4.01 (2H, t,  $J=6.5\text{Hz}$ ), 4.42 (2H, q,  $J=7.1\text{Hz}$ ), 6.93 (1H, d,  $J=8.7\text{Hz}$ ), 7.37 (1H, d,  $J=15.6\text{Hz}$ ), 7.60 (2H, d,  $J=8.7\text{Hz}$ ), 7.81 (1H, d,  $J=15.6\text{Hz}$ ), 8.03 (2H, d,  $J=8.5\text{Hz}$ ), 8.16 (2H, d,  $J=8.5\text{Hz}$ )
- 10  $\rho$  APCI-MASS :  $m/z = 367$  ( $\text{M}+\text{H}^+$ )

The following compound was obtained according to a similar manner to that of Preparation 314.

15

Preparation 315

Ethyl 4-oxo-1-(4-n-hexyloxyphenyl)piperidine-3-carboxylate

- 20  $\rho$  IR (Neat) : 1664.3, 1511.9, 1243.9, 1216.9  $\text{cm}^{-1}$
- $\rho$  NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 0.90 (3H, t,  $J=6.5\text{Hz}$ ), 1.2-1.5 (6H, m), 1.32 (3H, t,  $J=7.1\text{Hz}$ ), 1.65-1.85 (2H, m), 2.51 (2H, t,  $J=5.8\text{Hz}$ ), 3.31 (2H, t,  $J=5.8\text{Hz}$ ), 3.76 (2H, s), 3.91 (2H, t,  $J=6.5\text{Hz}$ ), 4.26 (2H, q,  $J=7.1\text{Hz}$ ), 6.84 (2H, d,  $J=9.2\text{Hz}$ ), 6.94 (2H, d,  $J=9.2\text{Hz}$ ), 12.06 (1H, s)
- 25  $\rho$  APCI-MASS :  $m/z = 348$  ( $\text{M}^++\text{H}$ )

Preparation 316

- 30 To a solution of 4-n-Hexyloxybenzoylhydrazine (1.96 g) and pyridine (0.74 ml) in tetrahydrofuran (20 ml) was added a solution of terephthalic acid monomethyl ester chloride (1.56 g) in tetrahydrofuran (15 ml) dropwise at  $0^\circ\text{C}$ . The reaction mixture was stirred at room temperature for 2 hours, and poured into water. The precipitate was collected by
- 35 filtration and washed with acetonitrile. The residue was

dried under reduced pressure to give 1-(4-n-Hexyloxybenzoyl)-2-(4-methoxycarbonylbenzoyl)hydrazine (2.99 g).

IR (KBr) : 3230, 3023, 2954, 2858, 1724, 1681, 1643, 1280, 1251, 1105  $\text{cm}^{-1}$

<sup>5</sup> NMR (DMSO- $d_6$ ,  $\delta$ ) : 0.88 (3H, t,  $J=6.6\text{Hz}$ ), 1.2-1.5 (6H, m), 1.6-1.8 (2H, m), 3.90 (3H, s), 4.04 (2H, t,  $J=6.4\text{Hz}$ ), 7.04 (2H, d,  $J=8.7\text{Hz}$ ), 7.90 (2H, d,  $J=8.7\text{Hz}$ ), 8.03 (2H, d,  $J=8.4\text{Hz}$ ), 8.10 (2H, d,  $J=8.4\text{Hz}$ ), 10.42 (1H, s), 10.65 (1H, s)

<sup>10</sup> APCI-MASS :  $m/z = 399 (M+H)^+$

Preparation 317

<sup>15</sup> A mixture of 1-(4-n-Hexyloxyphenyl)-4-piperidone (0.823 g), 1-(4-Ethoxycarbonylphenyl)piperazine (0.7 g), and titanium(IV) isopropoxide (1.11 ml) was stirred at room temperature. After 1 hour, the IR spectrum of the mixture showed no ketone band, and the viscous solution was diluted with absolute ethanol (3 ml). Sodium cyanoborohydride (0.121 g) was added, and the solution was stirred for 3 hours.

<sup>20</sup> Water (3 ml) was added with stirring, and the resulting inorganic precipitate was filtered and washed with ethanol. The filtrate was extracted with ethyl acetate. The organic layer was taken and dried over magnesium sulfate. The magnesium sulfate was filtered off, and filtrate was

<sup>25</sup> evaporated under reduced pressure to give Ethyl 4-[4-[1-(4-n-hexyloxyphenyl)piperidin-4-yl]piperazin-1-yl]benzoate (331 mg).

IR (KBr) : 1708.6, 1606.4, 1511.9, 1284.4, 1236.1  $\text{cm}^{-1}$

<sup>30</sup> NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 0.90 (3H, t,  $J=6.5\text{Hz}$ ), 1.2-1.55 (6H, m), 1.37 (3H, t,  $J=7.1\text{Hz}$ ), 1.6-1.85 (4H, m), 1.95 (2H, d,  $J=12\text{Hz}$ ), 2.41 (1H, m), 2.62 (2H, d,  $J=11\text{Hz}$ ), 2.75 (4H, t,  $J=5.0\text{Hz}$ ), 3.35 (4H, t,  $J=5.0\text{Hz}$ ), 3.58 (2H, d,  $J=11\text{Hz}$ ), 3.90 (2H, t,  $J=6.5\text{Hz}$ ), 4.32 (2H, q,  $J=7.1\text{Hz}$ ), 6.7-7.0 (6H, m),

<sup>35</sup> 7.92 (2H, d,  $J=9.0\text{Hz}$ )

f APCI-MASS :  $m/z = 494 (M^+ + H)$

The following compound was obtained according to a similar manner to that of Preparation 317.

5

cl Preparation 318

cl 1-tert-Butoxycarbonyl-4-(4-phenylcyclohexyl)piperazine

f IR (KBr) : 1697.1, 1245.8, 1170.6, 1124.3, 700  $\text{cm}^{-1}$

10 f NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 1.2-1.65 (17H, m), 1.9-2.1 (4H, m),  
2.3-2.6 (2H, m), 2.55 (4H, t,  $J=5.0\text{Hz}$ ), 3.44 (4H,  
t,  $J=5.0\text{Hz}$ ), 7.1-7.4 (5H, m)

f APCI-MASS :  $m/z = 345 (M^+ + H)$

cl Preparation 319

15 To a suspension of 1-(N,N-dimethylamino)-2-(4-ethoxycarbonylbenzoyl)ethylene (0.742 g) and 4-n-hexyloxybenzamidinium hydrochloride (0.847 g) in methanol (10 ml) was added 28% sodium methoxide in methanol (0.64 ml). The suspension was refluxed for 6 hours, and partitioned with  
20 ethyl acetate and water. The organic layer was washed with water and brine, dried over magnesium sulfate and evaporated under reduced pressure. The residue was triturated with acetonitrile, collected by filtration and dried under reduced pressure to give Methyl 4-[2-(4-n-hexyloxyphenyl)pyrimidin-6-yl]benzoate (0.61 g).

25 f IR (KBr) : 2931, 2861, 1722, 1606, 1558, 1251  $\text{cm}^{-1}$

f NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 0.95 (3H, t,  $J=6.7\text{Hz}$ ), 1.2-1.6 (6H, m), 1.8-2.0 (2H, m), 3.97 (3H, s), 4.05 (2H, t,  $J=6.5\text{Hz}$ ), 7.02 (2H, d,  $J=8.8\text{Hz}$ ), 7.56 (1H, d,  $J=5.2\text{Hz}$ ), 8.18 (2H, d,  $J=8.6\text{Hz}$ ), 8.28 (2H, d,  $J=8.6\text{Hz}$ ), 8.52 (2H, d,  $J=8.8\text{Hz}$ ), 8.83 (1H, d,  $J=5.2\text{Hz}$ )

30 f APCI-MASS :  $m/z = 391 (M + H^+)$

35 cl Preparation 320

66720-29287360

A solution of 1-(4-Methoxycarbonylphenyl)-3-(4-n-pentyloxyphenyl)-1-propen-3-one (4.0 g) and hydroxyamine hydrochloride (3.93 g) in ethanol (40 ml) was refluxed for 4 hours. The mixture was diluted with ethyl acetate, and the organic layer was washed with water (x 2), brine and dried over magnesium sulfate. The solvents were removed under reduced pressure to give crude oxime. To a solution of crude oxime in 1,2-dichloroethane (20 ml) was added activated-manganese(IV) oxide (10.0 g). The reaction mixture was refluxed for 2 hours and filtered. The residue was washed with dichloromethane. The solvents were removed under reduced pressure and the residue was triturated with acetonitrile. The solid was collected by filtration and dried to give Methyl 4-[3-(4-n-pentyloxyphenyl)isoxazol-5-yl]benzoate (0.98 g).

IR (KBr) : 2940, 2871, 1720, 1612, 1278, 1249, 1178, 1108  $\text{cm}^{-1}$

NMR (DMSO- $d_6$ ,  $\delta$ ) : 0.94 (3H, t,  $J=7.2\text{Hz}$ ), 1.2-1.6 (4H, m), 1.7-1.9 (2H, m), 3.95 (3H, s), 4.01 (2H, t,  $J=6.5\text{Hz}$ ), 6.87 (1H, s), 6.98 (2H, d,  $J=8.9\text{Hz}$ ), 7.79 (2H, d,  $J=8.9\text{Hz}$ ), 7.89 (2H, d,  $J=8.6\text{Hz}$ ), 8.15 (2H, d,  $J=8.6\text{Hz}$ )

APCI-MASS :  $m/z = 366$  ( $M+H^+$ )

✓ Preparation 321

To a solution of 4-Methoxycarbonylphenylhydroxyimino-methyl chloride (16.98 g) and 4-n-pentyloxyphenylacetylene (18.96 g) in tetrahydrofuran (170 ml) was added triethylamine (14.4 ml) in tetrahydrofuran (140 ml) over a period of 2 hours at 40°C and the mixture was stirred at 40°C for 30 minutes. The mixture was diluted with dichloromethane and washed with water and brine. The separated organic layer was dried over magnesium sulfate and evaporated under reduced pressure. The residue was triturated with acetonitrile. The precipitate was collected by filtration and dried to give

Methyl 4-[5-(4-n-pentyloxyphenyl)isoxazol-3-yl]benzoate  
(24.56 g).

IR (KBr) : 2942, 2873, 1716, 1616, 1508, 1280,  
1108  $\text{cm}^{-1}$

5  $^1\text{H}$  NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 0.95 (3H, t,  $J=6.9\text{Hz}$ ), 1.3-1.6 (4H, m), 1.8-2.0 (2H, m), 3.95 (3H, s), 4.02 (2H, t,  $J=6.5\text{Hz}$ ), 6.74 (1H, s), 6.99 (2H, d,  $J=8.8\text{Hz}$ ), 7.76 (2H, d,  $J=8.8\text{Hz}$ ), 7.93 (2H, d,  $J=8.5\text{Hz}$ ), 8.14 (2H, d,  $J=8.5\text{Hz}$ )

10  $^1\text{H}$  APCI-MASS :  $m/z = 366$  ( $\text{M}+\text{H}^+$ )

Preparation 322

To a solution of N-Hydroxy-4-octyloxybenzamidine (1.89 g) in pyridine (10 ml) was added terephthalic acid monomethyl ester chloride (1.67 g) in tetrahydrofuran (15 ml) dropwise at  $0^\circ\text{C}$ . The mixture was stirred at room temperature for 15 minutes, and poured into water. The precipitate was collected by filtration, dried and dissolved in pyridine (10 ml). The solution was refluxed for 1 hour. The reaction mixture was diluted with ethyl acetate and washed with 1N HCl, water and brine. The separated organic layer was dried over magnesium sulfate and the solvents were removed under reduced pressure. The residue was triturated with acetonitrile and collected by filtration. The solid was dried to give Methyl 4-[3-(4-n-hexyloxyphenyl)-1,2,4-oxadiazol-5-yl]benzoate (2.27 g).

IR (KBr) : 2950, 2925, 2863, 1720, 1280, 1255  $\text{cm}^{-1}$

30  $^1\text{H}$  NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 0.92 (3H, t,  $J=6.6\text{Hz}$ ), 1.2-1.9 (8H, m), 3.97 (3H, s), 4.03 (2H, d,  $J=6.5\text{Hz}$ ), 7.00 (2H, d,  $J=8.9\text{Hz}$ ), 8.09 (2H, d,  $J=8.9\text{Hz}$ ), 8.20 (2H, d,  $J=6.6\text{Hz}$ ), 8.28 (2H, d,  $J=6.6\text{Hz}$ )

$^1\text{H}$  APCI-MASS :  $m/z = 381$  ( $\text{M}+\text{H}^+$ )

Preparation 323

35 A suspension of 1-(4-n-Hexyloxybenzoyl)-2-(4-

methoxycarbonylbenzoyl)hydrazine (1.00 g) in phosphorus  
oxychloride (5 ml) was refluxed for 1 hour. After cooling,  
the solution was concentrated under reduced pressure. The  
residue was poured into ice-water and extracted with  
5 dichloromethane. The organic layer was washed with water,  
brine and dried over magnesium sulfate. The solvents were  
removed under reduced pressure. The residue was triturated  
with acetonitrile, collected by filtration and dried under  
reduced pressure to give Methyl 4-[5-(4-n-hexyloxyphenyl)-  
10 1,3,4-oxadiazole-2-yl]benzoate (761 mg).

IR (KBr) : 2954, 2854, 1724, 1612, 1494, 1280,  
1249  $\text{cm}^{-1}$

NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 0.91 (3H, t,  $J=6.6\text{Hz}$ ), 1.3-1.6 (6H,  
m), 1.7-1.9 (2H, m), 3.96 (3H, s), 4.04 (2H, t,  
15  $J=6.5\text{Hz}$ ), 7.02 (2H, d,  $J=8.6\text{Hz}$ ), 8.07 (2H, d,  
 $J=8.6\text{Hz}$ ), 8.19 (4H, m)

APCI-MASS :  $m/z = 381$  ( $M+H$ )<sup>+</sup>

The following compounds (Preparations 324 to 327) were  
20 obtained according to a similar manner to that of Preparation  
323.

CL Preparation 324

CL Methyl 4-[5-[4-(4-n-propyloxyphenyl)phenyl]-1,3,4-  
25 oxadiazol-2-yl]benzoate

IR (KBr) : 1720, 1614, 1496, 1280, 1103  $\text{cm}^{-1}$

NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 1.07 (3H, d,  $J=7.5\text{Hz}$ ), 1.84 (2H, tq,  
 $J=6.5$  and  $7.5\text{Hz}$ ), 3.98 (3H, s), 3.99 (2H, t,  
 $J=6.5\text{Hz}$ ), 7.01 (2H, d,  $J=8.8\text{Hz}$ ), 7.60 (2H, d,  
30  $J=8.8\text{Hz}$ ), 7.73 (2H, d,  $J=8.5\text{Hz}$ ), 8.19 (2H, d,  
 $J=8.5\text{Hz}$ ), 8.22 (4H, s)

APCI-MASS :  $m/z = 415$  ( $M+H$ )<sup>+</sup>

CL Preparation 325

CL Methyl 4-[5-(n-nonyl)-1,3,4-oxadiazol-2-yl]benzoate  
35



IR (KBr) : 2915, 2848, 1724, 1569, 1436, 1413,  
1278  $\text{cm}^{-1}$

NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 0.88 (3H, t,  $J=6.4\text{Hz}$ ), 1.2-1.6 (12H, m), 1.8-2.0 (2H, m), 2.94 (2H, t,  $J=7.6\text{Hz}$ ), 3.96 (3H, s), 8.11 (2H, d,  $J=8.8\text{Hz}$ ), 8.17 (2H, d,  $J=8.8\text{Hz}$ )

APCI-MASS :  $m/z = 331$  ( $M+H$ )<sup>+</sup>

Preparation 326

Methyl 4-[5-[4-(8-methoxyoctyloxy)phenyl]-1,3,4-oxadiazol-2-yl]benzoate

IR (KBr) : 2925, 2858, 1722, 1614, 1280, 1259  $\text{cm}^{-1}$

NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 1.3-1.9 (12H, m), 3.36 (3H, s), 3.37 (2H, t,  $J=6.4\text{Hz}$ ), 3.97 (3H, s), 4.04 (2H, t,  $J=6.5\text{Hz}$ ), 7.02 (2H, d,  $J=8.9\text{Hz}$ ), 8.07 (2H, d,  $J=8.9\text{Hz}$ ), 8.20 (4H, s)

APCI-MASS :  $m/z = 439$  ( $M+H$ )<sup>+</sup>

Preparation 327

Methyl 4-[5-(4-n-octyloxyphenyl)-1,3,4-oxadiazol-2-yl]benzoate

IR (KBr) : 2923, 2856, 1722, 1614, 1496, 1282, 1103  $\text{cm}^{-1}$

NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 0.89 (3H, t,  $J=6.8\text{Hz}$ ), 1.2-1.6 (10H, m), 1.7-1.9 (2H, m), 3.97 (3H, s), 4.04 (2H, t,  $J=6.5\text{Hz}$ ), 7.03 (2H, d,  $J=8.7\text{Hz}$ ), 8.07 (2H, d,  $J=8.7\text{Hz}$ ), 8.19 (4H, m)

APCI-MASS :  $m/z = 409$  ( $M+H$ )<sup>+</sup>

Preparation 328

A suspension of 1-(4-Hexyloxybenzoyl)-2-(4-methoxycarbonylbenzoyl)hydrazine (1.0 g) and di-phosphorus pentasulfide (1.28 g) in tetrahydrofuran (15 ml) was stirred at room temperature for 3 hours. The mixture was diluted with water (30 ml), stirred for 30 minutes and extracted with

dichloromethane. The organic layer was washed with brine, dried over magnesium sulfate and evaporated under reduced pressure. The residue was triturated with acetonitrile. The solid was collected by filtration and dried under reduced pressure to give Methyl 4-[5-(4-n-hexyloxyphenyl)-1,3,4-

IR (KBr) : 2925, 2871, 1722, 1608, 1436, 1276, 1106  $\text{cm}^{-1}$

NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 0.92 (3H, t,  $J=6.6\text{Hz}$ ), 1.3-2.0 (8H, m), 3.96 (3H, s), 4.03 (2H, t,  $J=6.5\text{Hz}$ ), 6.99 (2H, d,  $J=8.6\text{Hz}$ ), 7.95 (2H, d,  $J=8.4\text{Hz}$ ), 8.16 (2H, d,  $J=8.4\text{Hz}$ )

APCI-MASS :  $m/z = 397 (M+H)^+$

The following compounds (Preparations 329 to 334) were obtained according to a similar manner to that of Preparation 328.

Preparation 329

Methyl 4-[5-[4-(8-methoxyoctyloxy)phenyl]-1,3,4-thiadiazol-2-yl]benzoate

IR (KBr) : 3210, 2935, 2856, 1718, 1600, 1465, 1280, 1110  $\text{cm}^{-1}$

NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 1.3-1.6 (10H, m), 1.7-1.9 (2H, m), 3.33 (3H, s), 3.37 (2H, d,  $J=6.4\text{Hz}$ ), 3.96 (3H, s), 4.03 (2H, t,  $J=6.5\text{Hz}$ ), 6.99 (2H, d,  $J=8.9\text{Hz}$ ), 7.94 (2H, d,  $J=8.9\text{Hz}$ ), 8.07 (2H, d,  $J=8.6\text{Hz}$ ), 8.16 (2H, d,  $J=8.6\text{Hz}$ )

APCI-MASS :  $m/z = 455 (M+H^+)$

Preparation 330

Methyl 4-[5-(4-cyclohexylphenyl)-1,3,4-thiadiazol-2-yl]benzoate

IR (KBr) : 2925, 2850, 1716, 1432, 1274, 1108, 997  $\text{cm}^{-1}$

NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 1.2-1.6 (5H, m), 1.7-2.0 (5H, m),

2.58 (1H, m), 3.96 (3H, s), 7.34 (2H, d, J=8.2Hz),  
7.93 (2H, d, J=8.2Hz), 8.07 (2H, d, J=8.6Hz), 8.16  
(2H, d, J=8.6Hz)

APCI-MASS :  $m/z = 379$  ( $M+H^+$ )

5

CL Preparation 331

CL Methyl 4-[5-[4-(piperidin-1-yl)phenyl]-1,3,4-thiadiazol-2-yl]benzoate

IR (KBr) : 2940, 2848, 1720, 1602, 1436, 1415, 1276,  
1108  $\text{cm}^{-1}$

10

NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 1.68 (6H, br), 3.34 (4H, br), 3.96  
(3H, s), 6.95 (2H, d, J=8.7Hz), 7.88 (2H, d,  
J=8.7Hz), 8.05 (2H, d, J=8.6Hz), 8.16 (2H, d,  
J=8.6Hz)

15

APCI-MASS :  $m/z = 380$  ( $M+H^+$ )

CL Preparation 332

CL Methyl 4-[5-(4-n-octyloxyphenyl)-1,3,4-thiadiazol-2-yl]benzoate

IR (KBr) : 2927, 2858, 1720, 1606, 1434, 1276,  
1106  $\text{cm}^{-1}$

20

NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 0.89 (3H, t, J=6.8Hz), 1.2-1.6 (10H,  
m), 1.7-1.9 (2H, m), 3.96 (3H, s), 4.03 (2H, t,  
J=6.5Hz), 7.00 (2H, d, J=8.9Hz), 7.95 (2H, d,  
J=8.9Hz), 8.06 (2H, d, J=8.4Hz), 8.16 (2H, d,  
J=8.4Hz)

25

APCI-MASS :  $m/z = 425$  ( $M+H^+$ )

CL Preparation 333

CL Methyl 4-[5-(4-trans-n-pentylcyclohexyl)-1,3,4-thiadiazol-2-yl]benzoate

IR (KBr) : 2923, 2850, 1722, 1440, 1276, 1110  $\text{cm}^{-1}$

NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 0.89 (3H, t, J=6.9Hz), 1.0-1.8 (13H,  
m), 1.92 (2H, d, J=13.4Hz), 2.24 (2H, d, J=12.2Hz),  
3.15 (1H, tt, J=12.2 and 3.5Hz), 3.95 (3H, s), 8.01

35

(2H, dd, J=8.6 and 2.0Hz), 8.13 (2H, dd, J=8.6 and 2.0Hz)

Ⓟ APCI-MASS : m/z = 373 (M+H<sup>+</sup>)

5 Preparation 334

Ⓞ Methyl 4-[5-[4-(4-n-propyloxyphenyl)phenyl]-1,3,4-thiadiazol-2-yl]benzoate

Ⓟ IR (KBr) : 1720, 1540, 1508, 1282 cm<sup>-1</sup>

10 Ⓟ NMR (CDCl<sub>3</sub>, δ) : 1.07 (3H, t, J=7.5Hz), 1.85 (2H, m), 3.9-4.1 (5H, m), 7.01 (2H, d, J=8.8Hz), 7.59 (2H, d, J=8.8Hz), 7.70 (2H, d, J=8.4Hz), 8.07 (2H, d, J=8.4Hz), 8.1-8.2 (4H, m)

Ⓟ APCI-MASS : m/z = 431 (M+H)<sup>+</sup>

15 Preparation 335

To a suspension of 4-hexyloxybenzoic acid in oxalyl chloride (10 ml) and dichloromethane (10 ml) was added N,N-dimethylformamide (0.1 ml). The mixture was stirred at room temperature for 2 hours. The solvent was removed under reduced pressure to give crude 4-hexyloxybenzoyl chloride. 20 To a suspension of Ethyl 3-amino-4-hydroxybenzoate (733 mg) and triethylamine (1.38 ml) and 4-dimethylaminopyridine (DMAP, 10 mg) in methylene chloride (10 ml) was added the solution of 4-hexyloxybenzoyl chloride obtained above in 25 dichloromethane (5 ml) dropwise at 10°C. The reaction mixture was stirred at 10°C for 1.5 hours and diluted with dichloromethane (20 ml). The solution was washed with H<sub>2</sub>O (20 ml), 1N HCl aq. (20 ml x 2), H<sub>2</sub>O (20 ml) and brine (20 ml) successively. The organic layer was dried over MgSO<sub>4</sub> and 30 the solvent was removed under reduced pressure. To the residue was added toluene (15 ml) and p-toluenesulfonic acid (10 mg). The mixture was refluxed for 6 hours and the solvent was removed under reduced pressure. The residue was triturated with acetonitrile, and precipitate was collected 35 with filtration and dried over PO<sub>5</sub> to give 2-(4-

Hexyloxyphenyl)-5-ethoxycarbonylbenzoxazole (0.60 g).

IR (KBr) : 2952, 2871, 1712, 1623, 1500, 1294,  
1255  $\text{cm}^{-1}$

5 NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 0.92 (3H, t,  $J=6.6\text{Hz}$ ), 1.3-1.6 (9H, m), 1.7-1.9 (2H, m), 4.05 (2H, t,  $J=6.5\text{Hz}$ ), 4.42 (2H, q,  $J=7.1\text{Hz}$ ), 7.03 (2H, d,  $J=6.9\text{Hz}$ ), 7.57 (1H, d,  $J=8.6\text{Hz}$ ), 8.08 (1H, dd,  $J=8.6$  and  $1.7\text{Hz}$ ), 8.18 (2H, d,  $J=6.9\text{Hz}$ ), 8.43 (1H, d,  $J=1.7\text{Hz}$ )

APCI-MASS :  $m/z = 368$  ( $\text{M}+\text{H}^+$ )

10

The following compounds (Preparations 336 to 337) were obtained according to a similar manner to that of Preparation 335.

15 Preparation 336

5-Ethoxycarbonyl-2-(2-octyloxypyridin-5-yl)benzoxazole

IR (KBr) : 2933, 2858, 1716, 1623, 1604, 1577, 1467,  
1290, 1213, 1083  $\text{cm}^{-1}$

20 NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 0.89 (3H, t,  $J=6.7\text{Hz}$ ), 1.2-1.5 (10H, m), 1.43 (3H, t,  $J=7.1\text{Hz}$ ), 1.7-1.9 (2H, m), 4.3-4.5 (4H, m), 6.87 (1H, d,  $J=8.7\text{Hz}$ ), 7.60 (1H, d,  $J=8.6\text{Hz}$ ), 8.11 (1H, dd,  $J=8.6$  and  $1.6\text{Hz}$ ), 8.37 (1H, dd,  $J=8.8$  and  $2.4\text{Hz}$ ), 8.45 (1H, d,  $J=1.6\text{Hz}$ ), 9.03 (1H, d,  $J=2.4\text{Hz}$ )

25 APCI-MASS :  $m/z = 397$  ( $\text{M}+\text{H}^+$ )

Preparation 337

2-[4-(4-Hexylphenyl)phenyl]-5-ethoxycarbonylbenzoxazole

IR (KBr) : 2952, 2871, 1712, 1623, 1500, 1294, 1255,  
1024  $\text{cm}^{-1}$

30 NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 0.90 (3H, t,  $J=6.6\text{Hz}$ ), 1.2-1.5 (6H, m), 1.44 (3H, t,  $J=7.1\text{Hz}$ ), 1.6-1.8 (2H, m), 2.67 (2H, t,  $J=7.3\text{Hz}$ ), 4.43 (2H, q,  $J=7.1\text{Hz}$ ), 7.27 (1H, d,  $J=3.7\text{Hz}$ ), 7.32 (1H, s), 7.5-7.7 (3H, m), 7.77 (2H, d,  $J=8.6\text{Hz}$ ), 8.12 (1H, dd,  $J=8.6$  and  $1.7\text{Hz}$ ),

35

8.32 (2H, d, J=8.5Hz), 8.48 (1H, d, J=1.2Hz)

⌈ APCI-MASS : m/z = 428 (M+H<sup>+</sup>)

CL Preparation 338

5 A suspension of 4-[4-(8-bromooctyloxy)phenyl]benzoic acid (1 g) in 2,6-dimethylmorpholine (3.06 ml) was refluxed for 30 minutes. The reaction mixture was added to a mixture of water and ethyl acetate and adjusted to pH 2.0 with conc. HCl. The organic layer was taken and dried over magnesium sulfate. The magnesium sulfate was filtered off, and the filtrate was evaporated under reduced pressure to give 4-[4-[8-(2,6-dimethylmorpholin-4-yl)octyloxy]phenyl]benzoic acid hydrochloride (0.95 g).

⌈ IR (KBr) : 2939.0, 1704.8, 1606.4, 1189.9 cm<sup>-1</sup>

15 ⌈ NMR (DMSO-d<sub>6</sub>, δ) : 1.12 (6H, d, J=6.3Hz), 1.2-1.6 (10H, m), 1.6-1.9 (4H, m), 2.4-2.7 (2H, m), 2.9-3.1 (2H, m), 3.8-4.0 (2H, m), 4.02 (2H, t, J=6.3Hz), 7.04 (2H, d, J=8.8Hz), 7.68 (2H, d, J=8.8Hz), 7.75 (2H, d, J=8.4Hz), 7.99 (2H, d, J=8.4Hz)

20 ⌈ APCI-MASS : m/z = 440 (M+H<sup>+</sup>)

CL Preparation 339

25 Sodium hydride (60% suspension in mineral oil, 108 mg) was added to ethoxyethanol (10 ml), and the solution was stirred at 60°C for 20 minutes. To the solution was added Methyl 4-[4-(8-bromooctyloxy)phenyl]benzoate (1.26 g), and the reaction mixture was stirred at 70°C for 2 hours. To the reaction mixture was added 10% sodium hydroxide aqueous solution (2.4 ml), and the solution was stirred at 70°C for 1 hour. After cooling, the solution was adjusted to pH 2.0 with 1N hydrochloric acid. The precipitate was collected by filtration, and dried to give 4-[4-[8-(2-Ethoxyethoxy)octyloxy]phenyl]benzoic acid (1.13 g).

35 ⌈ IR (KBr) : 2933, 2858, 1685, 1604, 1434, 1294, 1132 cm<sup>-1</sup>

- 1 NMR (DMSO- $d_6$ ,  $\delta$ ) : 1.09 (3H, t,  $J=7.0\text{Hz}$ ), 1.2-1.9 (14H, m), 3.2-3.6 (6H, m), 4.01 (2H, d,  $J=6.3\text{Hz}$ ), 7.04 (2H, d,  $J=8.8\text{Hz}$ ), 7.67 (2H, d,  $J=8.8\text{Hz}$ ), 7.74 (2H, d,  $J=8.5\text{Hz}$ ), 7.98 (2H, d,  $J=8.5\text{Hz}$ )
- 5 1 APCI-MASS :  $m/z = 415$  ( $M+H^+$ )

The following compound was obtained according to a similar manner to that of Preparation 300.

10 Preparation 340

4-n-Pentyloxybenzoylhydrazine

- 15 1 IR (KBr) : 3182, 2937, 2869, 1645, 1618, 1571, 1251  $\text{cm}^{-1}$
- 1 NMR (DMSO- $d_6$ ,  $\delta$ ) : 0.89 (3H, d,  $J=7.1\text{Hz}$ ), 1.2-1.8 (6H, m), 4.00 (2H, t,  $J=6.5\text{Hz}$ ), 4.41 (2H, s), 6.96 (2H, d,  $J=8.8\text{Hz}$ ), 7.78 (2H, d,  $J=8.8\text{Hz}$ ), 9.59 (1H, s)
- 1 APCI-MASS :  $m/z = 223$  ( $M+H^+$ )

The following compound was obtained according to a similar manner to that of Preparation 291.

20 Preparation 341

1-(4-Methoxycarbonylbenzoyl)-2-(4-n-pentyloxybenzoyl)-hydrazine

- 25 1 IR (KBr) : 3234, 2956, 2931, 1724, 1683, 1643, 1610, 1284, 1253  $\text{cm}^{-1}$
- 1 NMR (DMSO- $d_6$ ,  $\delta$ ) : 0.90 (3H, t,  $J=6.9\text{Hz}$ ), 1.2-1.5 (4H, m), 1.6-1.8 (2H, m), 3.90 (3H, s), 4.04 (2H, t,  $J=6.5\text{Hz}$ ), 7.04 (2H, d,  $J=8.8\text{Hz}$ ), 7.90 (2H, d,  $J=8.8\text{Hz}$ ), 8.03 (2H, d,  $J=8.7\text{Hz}$ ), 8.10 (2H, d,  $J=8.7\text{Hz}$ ), 10.42 (1H, s), 10.64 (1H, s)
- 30 1 APCI-MASS :  $m/z = 385$  ( $M+H^+$ )

The following compound was obtained according to a similar manner to that of Preparation 328.

CL Preparation 342

CL Methyl 4-[5-(4-n-pentyloxyphenyl)thiadiazol-2-yl]benzoate

- 5 P IR (KBr) : 2940, 2871, 1720, 1606, 1438, 1280  $\text{cm}^{-1}$   
P NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 0.95 (3H, t,  $J=7.1\text{Hz}$ ), 1.3-1.6 (4H, m), 1.8-2.0 (2H, m), 3.96 (3H, s), 4.03 (2H, t,  $J=6.5\text{Hz}$ ), 6.99 (2H, d,  $J=8.8\text{Hz}$ ), 7.94 (2H, d,  $J=8.8\text{Hz}$ ), 8.06 (2H, d,  $J=8.7\text{Hz}$ ), 8.16 (2H, d,  $J=8.7\text{Hz}$ )  
10 P APCI-MASS :  $m/z = 383$  ( $M+H^+$ )

The following compound was obtained according to a similar manner to that of Preparation 32

15 CL Preparation 343

CL 4-[5-(4-n-Pentyloxyphenyl)thiadiazol-2-yl]benzoic acid

- P IR (KBr) : 2954, 2867, 1687, 1602, 1432, 1294, 1255  $\text{cm}^{-1}$   
20 P NMR ( $\text{DMSO}-d_6$ ,  $\delta$ ) : 0.91 (3H, t,  $J=7.0\text{Hz}$ ), 1.3-1.5 (4H, m), 1.7-1.9 (2H, m), 4.07 (2H, t,  $J=6.7\text{Hz}$ ), 7.13 (2H, d,  $J=8.8\text{Hz}$ ), 7.97 (2H, d,  $J=8.8\text{Hz}$ ), 8.07 (4H, s)  
P APCI-MASS :  $m/z = 369$  ( $M+H^+$ )

- 25 The following compound was obtained according to a similar manner to that of Preparation 49.

CL Preparation 344

CL 1-[4-[5-(4-n-Pentyloxyphenyl)thiadiazol-2-yl]benzoyl]-benzotriazole 3-oxide

- 30 P IR (KBr) : 2948, 2873, 1770, 1602, 1257, 1232  $\text{cm}^{-1}$   
P NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 0.95 (3H, t,  $J=7.1\text{Hz}$ ), 1.3-1.6 (4H, m), 1.8-2.0 (2H, m), 4.04 (2H, t,  $J=6.5\text{Hz}$ ), 7.01 (2H, d,  $J=8.1\text{Hz}$ ), 7.4-7.7 (3H, m), 7.97 (2H, d,  $J=8.1\text{Hz}$ ), 8.12 (1H, d,  $J=8.2\text{Hz}$ ), 8.24 (2H, d,  
35  $J=8.1\text{Hz}$ )



J=8.0Hz), 8.40 (2H, d, J=8.0Hz)

Ⓟ APCI-MASS : m/z = 486 (M+H<sup>+</sup>)

✓ Preparation 345

5 To a solution of 4-bromobenzaldehyde oxime chloride (647 mg) and 4-n-pentyloxy-phenylacetylene (650 mg) in tetrahydrofuran (7 ml) was added triethylamine (0.5 ml) in tetrahydrofuran (5 ml) dropwise at 40°C. The solution was stirred at 40°C for 30 minutes, poured into water and  
10 extracted with ethyl acetate. The organic layer was washed with H<sub>2</sub>O, brine and dried over magnesium sulfate. The solvents were removed under reduced pressure and the residue was triturated with acetonitrile. The precipitate was collected by filtration and dried to give 4-[5-(4-n-pentyloxyphenyl)isoxazol-3-yl]bromobenzene (0.59 g).

Ⓟ IR (KBr) : 2948, 2867, 1612, 1430, 1255 cm<sup>-1</sup>

Ⓟ NMR (CDCl<sub>3</sub>, δ) : 0.95 (3H, t, J=6.9Hz), 1.3-1.6 (4H, m), 1.7-1.9 (2H, m), 4.01 (2H, t, J=6.5Hz), 6.66 (1H, s), 6.98 (2H, d, J=8.8Hz), 7.60 (2H, d, J=8.6Hz), 7.7-7.9 (4H, m)

Ⓟ APCI-MASS : m/z = 388 (M+H<sup>+</sup>)

✓ Preparation 346

25 To a suspension of 4-[5-(4-n-pentyloxyphenyl)isoxazol-3-yl]bromobenzene (386 mg) in tetrahydrofuran (5 ml) was added 1.55M n-butyllithium in hexane (0.84 ml) at -40°C under N<sub>2</sub> stream and the solution was stirred for 1 hour at -40°C. To the solution was added crushed dryice (1 g) and the suspension was stirred for 1 hour at -40°C. The suspension  
30 was diluted with H<sub>2</sub>O, and acidified with 1N-hydrochloric acid. The precipitate was collected by filtration and dried to give 4-[5-(4-n-pentyloxyphenyl)isoxazol-3-yl]benzoic acid (312 mg).

Ⓟ IR (KBr) : 2939, 2867, 1681, 1614, 1429, 1255, 1178, 821 cm<sup>-1</sup>

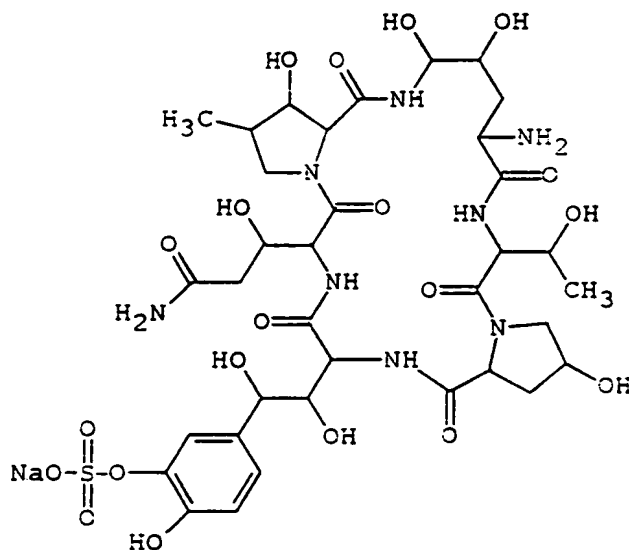
$\delta$  NMR (DMSO- $d_6$ ,  $\delta$ ) : 0.91 (3H, t,  $J=7.1\text{Hz}$ ), 1.3-1.5 (4H, m), 1.6-1.8 (2H, m), 4.04 (2H, t,  $J=6.5\text{Hz}$ ), 7.11 (2H, d,  $J=8.9\text{Hz}$ ), 7.54 (1H, s), 7.85 (2H, d,  $J=8.9\text{Hz}$ ), 7.98 (2H, d,  $J=8.6\text{Hz}$ ), 8.11 (2H, d,  $J=8.6\text{Hz}$ )

$\delta$  APCI-MASS :  $m/z = 352$  ( $M+H^+$ )

The Starting Compound in the following Examples 1 to 117 and The Object Compounds (1) to (122) and (124) in the following Examples 1 to 122 and 124 are illustrated by chemical formulae as below.

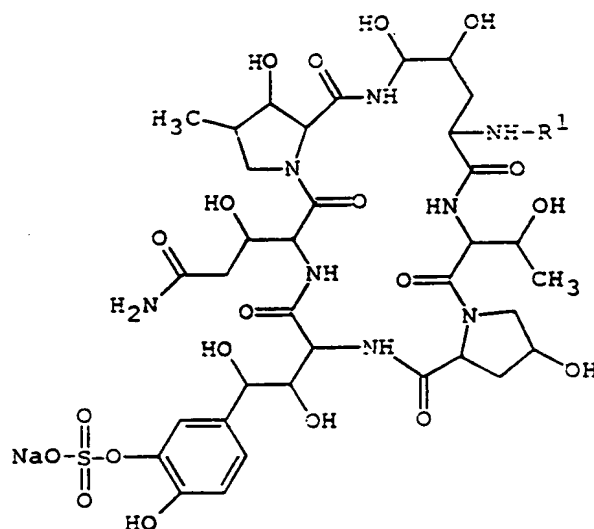
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$\delta$  The Starting Compound,  
 (the same in  
Examples 1 to 117)



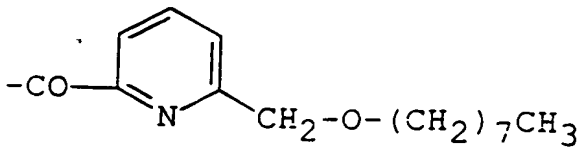
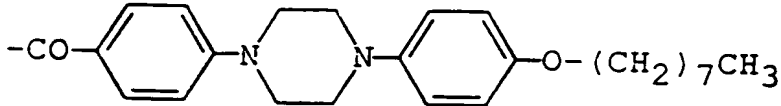
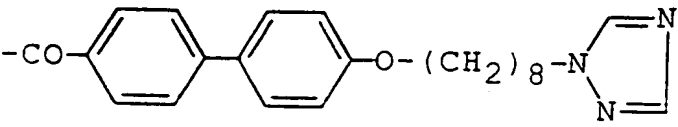
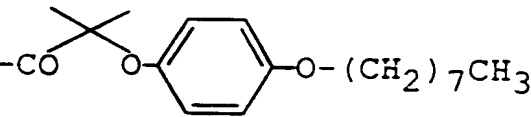
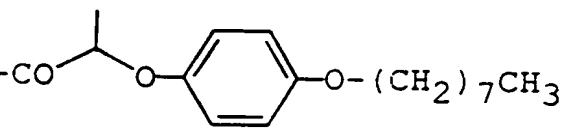
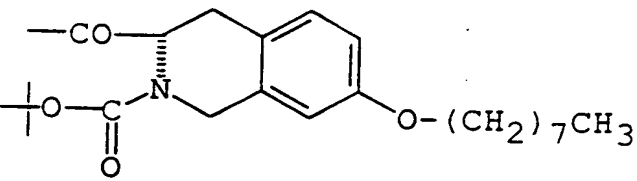
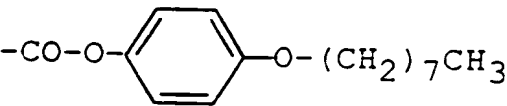
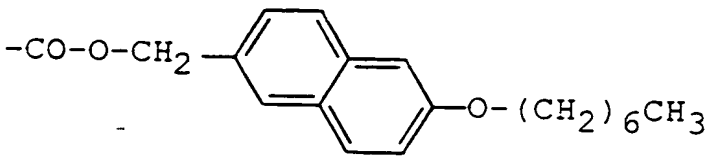
(SEE ID No: 1)

The Object Compounds (1) to (122) and (124),

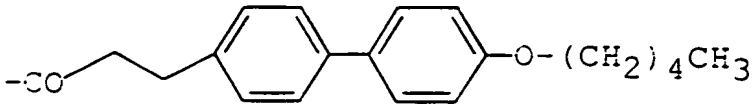
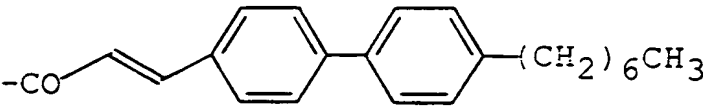
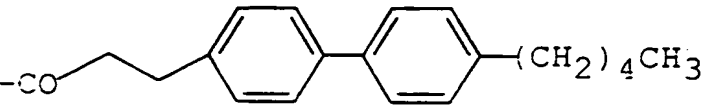
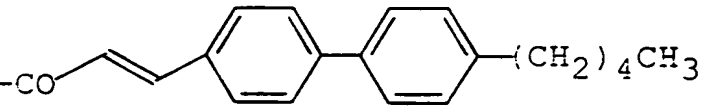
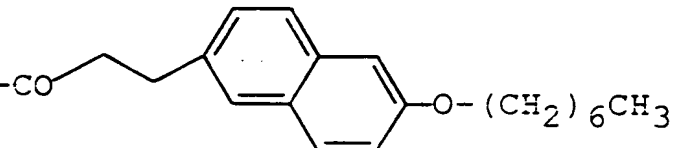
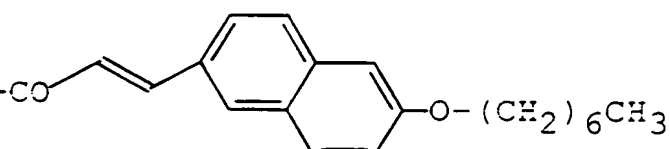
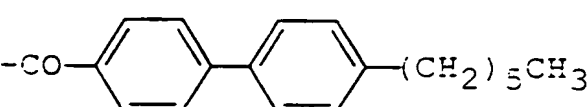
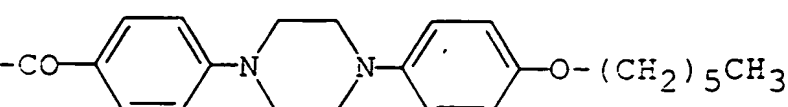
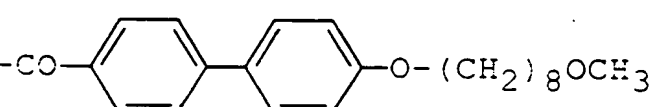


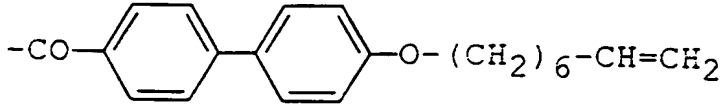
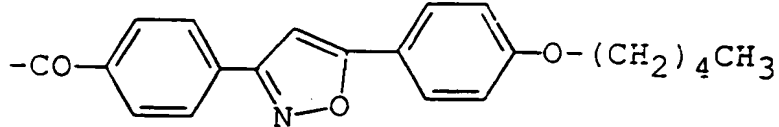
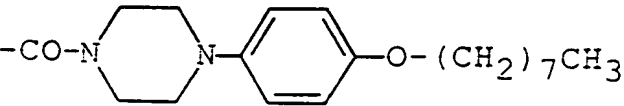
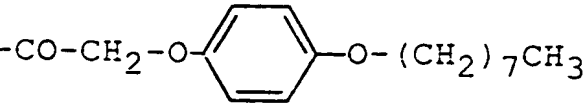
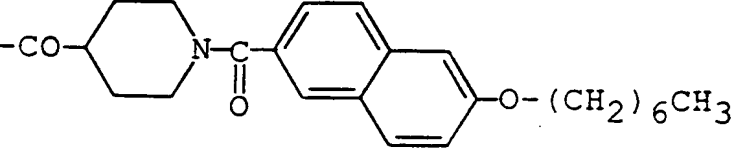
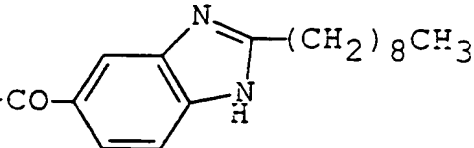
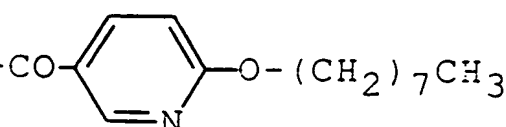
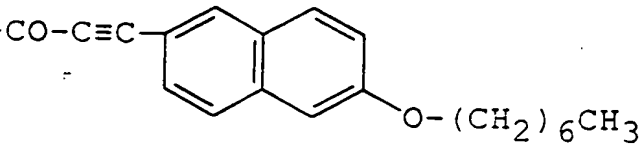
In the following Examples, The Object Compound (X)  
[e.g. The Object Compound (1)] means the object compound of  
Example (X) [e.g. Example (1)].

HT, 1690x

Example No.	R <sup>1</sup>
1	
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Example No.	R <sup>1</sup>
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12	
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Example No.	R <sup>1</sup>
16	
17	
18	
19	
20	
21	
22	
23	
24 major product	

Example No.	R <sup>1</sup>
24 minor product	
25	
26	
27	
28	
29	
30	
31	

Example No.	R <sup>1</sup>
32	
33	
34	
35	
36	
37	
38 major product	
38 minor product	

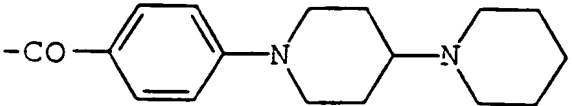
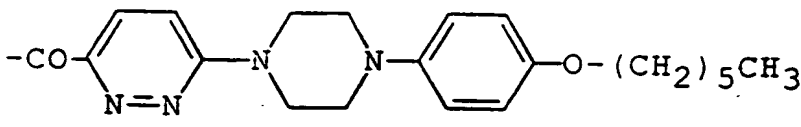
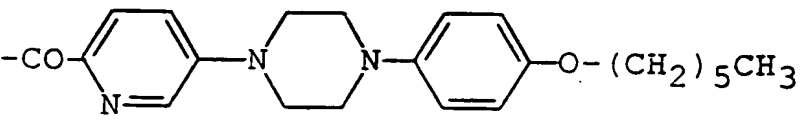
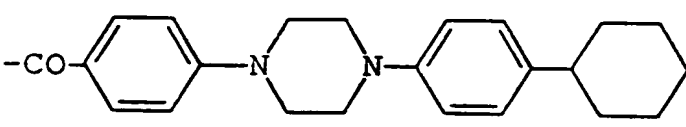
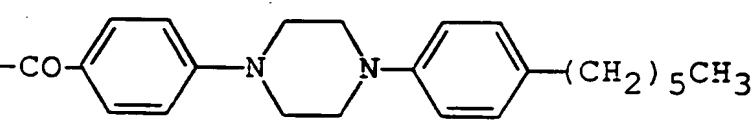
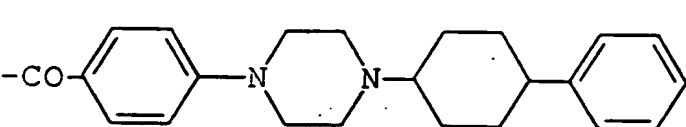
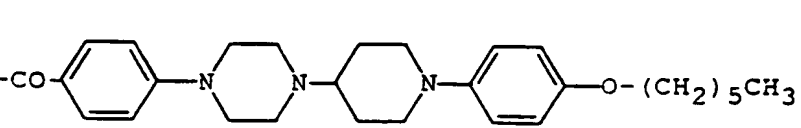
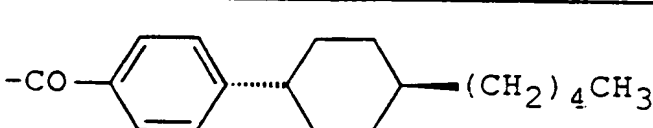


Example No.	R <sup>1</sup>
39	
40	
41	
42 mixture product	
43	
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45	
46	

Example No.	R <sup>1</sup>
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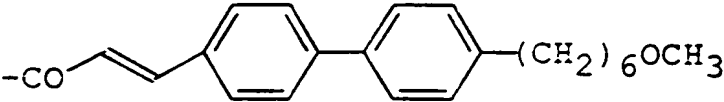
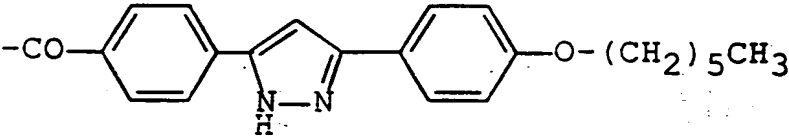
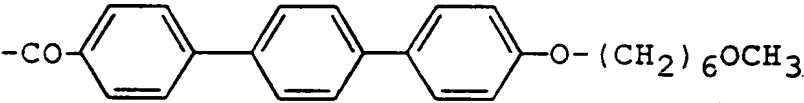
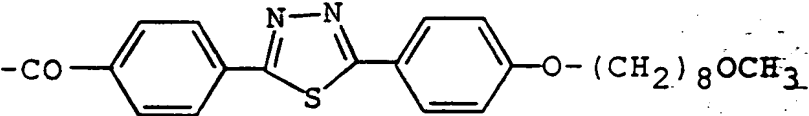
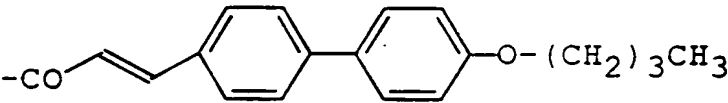
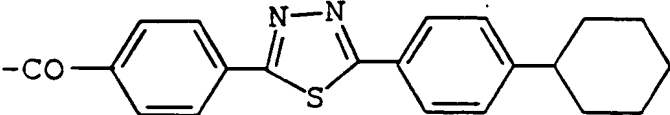
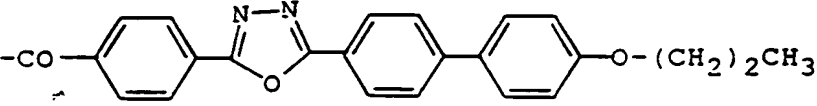
176

Example No.	R <sup>1</sup>
60	
61	
62	
63	
64 major product	
64 minor product	
65	
66	

Example No.	R <sup>1</sup>
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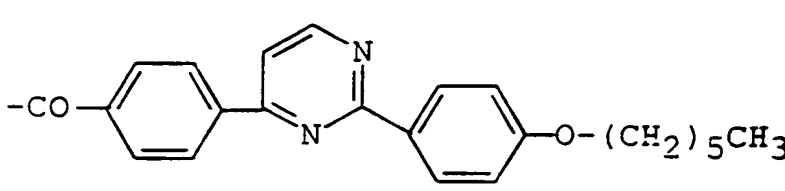
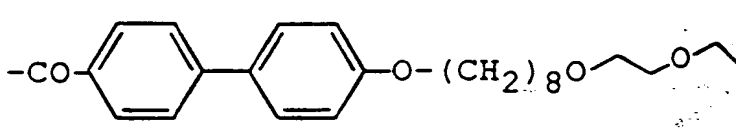
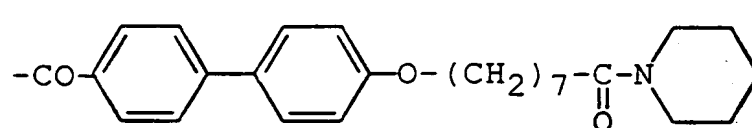
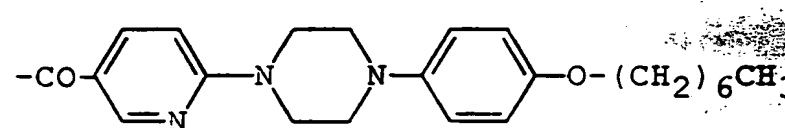
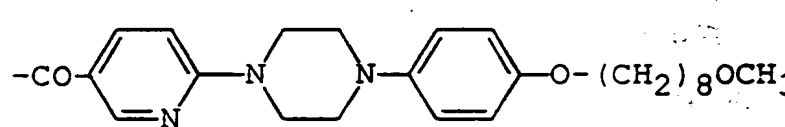
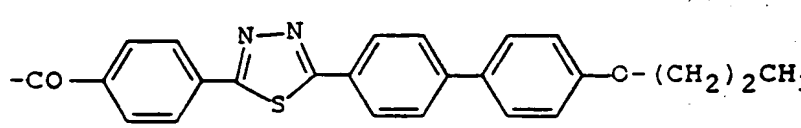
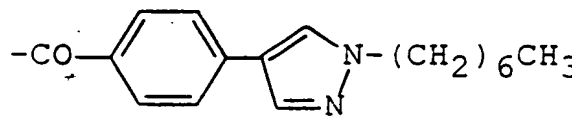
Example No.	$R^1$
75	
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Example No.	$R^1$
81	<chem>-CO-c1ccc2ccccc2c1-(CH2)6CH3</chem>
82	<chem>-CO-c1ccc2ccccc2c1-(CH2)5CH3</chem>
83	<chem>-CO/C=C/c1ccc(cc1)-c2ccc(cc2)OCCCCCCCCOC</chem>
84	<chem>-CO/C=C/c1ccc(cc1)-c2ccc(cc2)OCCCCC=C</chem>
85	<chem>-CO/C=C/c1ccc(cc1)-c2ccc(cc2)OCCCC(C)C</chem>
86	<chem>-CO/C=C/c1ccc(cc1)-c2ccc(cc2)OCCCCCCCCF</chem>

Example No.	R <sup>1</sup>
87	
88	
89	
90	
91	
92	
93	



Example No.	$R^1$
94	
95	
96	
97	
98	
99	
100	
101	

Example No.	R <sup>1</sup>
102	
103	
104	
105	
106	
107	
108	

Example No.	R <sup>1</sup>
109	
110	
111	
112	
113	
114	
115	

Example No.	$R^1$
116	
117	
118	
119	
120	
121	

Example No.	R <sup>1</sup>
122	<chem>-CO-CH=CH-C6H4-C6H4-O-(CH2)4CH3</chem>

Example No.	The Object Compound
123	

Example No.	R <sup>1</sup>
124	<chem>-CO-C6H4-c1nnsc1-C6H4-O-(CH2)4CH3</chem>

Example 1

To a solution of The Starting Compound (1 g) and 1-(6-octyl-oxymethylpicolinoyl)benzotriazole 3-oxide (0.399 g) in N,N-dimethylformamide (10 ml) was added 4-(N,N-dimethylamino)pyridine (0.140 g), and stirred for 12 hours at ambient temperature. The reaction mixture was pulverized with ethyl acetate. The precipitate was collected by filtration, and dried under reduced pressure. The powder was dissolved in water, and subjected to column chromatography on ion exchange resin (DOWEX-50WX4 (Trademark : prepared by Dow Chemical)) eluting with water. The fractions containing the object compound were combined, and subjected to column chromatography on ODS (YMC-gel-ODS-AM-S-50) (Trademark : prepared by Yamamura Chemical Lab.) eluting with 50% methanol aqueous solution. The fractions containing the object compound were combined, and evaporated under reduced pressure to remove methanol. The residue was lyophilized to give The Object Compound (1).

IR (KBr) : 3347, 1664, 1629, 1517  $\text{cm}^{-1}$

$^1\text{H}$  NMR (DMSO- $d_6$ ,  $\delta$ ) : 0.86 (3H, t,  $J=6.7\text{Hz}$ ), 0.98 (3H, d,  $J=6.7\text{Hz}$ ), 1.09 (3H, d,  $J=6.0\text{Hz}$ ), 1.2-1.47 (10H, m), 1.47-1.67 (2H, m), 1.67-2.06 (3H, m), 2.06-2.5 (4H, m), 3.19 (1H, m), 3.53 (2H, t,  $J=6.4\text{Hz}$ ), 3.5-3.85 (2H, m), 3.85-4.7 (13H, m), 5.35 (11H, m), 5.56 (1H, d,  $J=5.7\text{Hz}$ ), 6.73 (1H, d,  $J=8.3\text{Hz}$ ), 6.83 (1H, d,  $J=8.3\text{Hz}$ ), 6.89 (1H, s), 7.05 (1H, s), 7.11 (1H, s), 7.32 (1H, m), 7.43 (1H, d,  $J=8.5\text{Hz}$ ), 7.63 (1H, d,  $J=7.3\text{Hz}$ ), 7.85-8.13 (4H, m), 8.66 (1H, d,  $J=7.8\text{Hz}$ ), 8.84 (1H, s)

FAB-MASS :  $m/z = 1228$  ( $M^+ + \text{Na}$ )

Elemental Analysis Calcd. for  $\text{C}_{50}\text{H}_{72}\text{N}_9\text{O}_{22}\text{SNa} \cdot 6\text{H}_2\text{O}$  :

C 45.49, H 6.44, N 9.59

Found : C 45.89, H 6.52, N 9.69

CL

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## CL

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C 49.53, H 6.02, N 10.95

Found : C 49.26, H 6.22, N 10.77

CL Example 4

- IR (KBr) : 3350, 1660, 1631, 1047  $\text{cm}^{-1}$
- 5  $\text{P}$  NMR (DMSO- $d_6$ ,  $\delta$ ) : 0.86 (3H, t,  $J=6.9\text{Hz}$ ), 0.97 (3H, d,  $J=6.6\text{Hz}$ ), 1.09 (3H, d,  $J=5.3\text{Hz}$ ), 1.2-1.5 (10H, m), 1.37 (6H, s), 1.55-2.0 (5H, m), 2.1-2.6 (4H, m), 3.16 (1H, m), 3.73 (2H, m), 3.89 (2H, t,  $J=6.3\text{Hz}$ ), 3.95-4.49 (11H, m), 4.68-5.21 (10H, m), 5.25 (1H, d,  $J=4.1\text{Hz}$ ), 5.53 (1H, d,  $J=5.7\text{Hz}$ ), 6.73 (1H, d,  $J=8.2\text{Hz}$ ), 6.75-6.85 (4H, m), 6.91 (1H, d,  $J=8.2\text{Hz}$ ), 7.05 (1H, s), 7.15 (1H, s), 7.3-7.5 (2H, m), 7.9-8.2 (3H, m), 8.84 (1H, s)
- 10
- 15  $\text{P}$  FAB-MASS :  $m/z = 1271$  ( $M^+ + \text{Na}$ )
- $\text{P}$  Elemental Analysis Calcd. For  $\text{C}_{53}\text{H}_{77}\text{N}_8\text{O}_{23}\text{SNa} \cdot 4\text{H}_2\text{O}$  :  
C 48.18, H 6.48, N 8.48  
Found : C 48.04, H 6.51, N 8.38

20 CL Example 5

- $\text{P}$  IR (KBr) : 1666, 1629, 1222  $\text{cm}^{-1}$
- $\text{P}$  NMR (DMSO- $d_6$ ,  $\delta$ ) : 0.85 (3H, t,  $J=6.6\text{Hz}$ ), 0.9-1.12 (6H, m), 1.12-1.52 (13H, m), 1.52-1.93 (5H, m), 2.08-2.55 (4H, m), 3.16 (1H, m), 3.6-5.3 (26H, m), 5.49 + 5.54 (1H, d,  $J=5.8\text{Hz}$ , mixture of diastereomer), 6.60-7.1 (7H, m), 7.04 (1H, s), 7.1 (1H, m), 7.2-7.5 (2H, m), 7.9-8.43 (3H, m), 8.83 (1H, s)
- 25
- $\text{P}$  FAB-MASS :  $m/z = 1257$  ( $M^+ + \text{Na}$ )
- 30  $\text{P}$  Elemental Analysis Calcd. for  $\text{C}_{52}\text{H}_{75}\text{N}_8\text{O}_{23}\text{SNa} \cdot 3\text{H}_2\text{O}$  :  
C 48.44, H 6.33, N 8.69  
Found : C 48.16, H 6.51, N 8.53

CL Example 6

- 35  $\text{P}$  IR (KBr) : 3349, 1666, 1629, 1259  $\text{cm}^{-1}$



1 NMR (DMSO- $d_6$ ,  $\delta$ ) : 0.86 (3H, t,  $J=6.7\text{Hz}$ ), 0.9 (3H, d,  $J=5.7\text{Hz}$ ), 0.96 (3H, d,  $J=6.7\text{Hz}$ ), 1.1-1.55 (19H, m), 1.55-2.0 (5H, m), 2.0-2.47 (4H, m), 2.65-3.25 (3H, m), 3.5-5.13 (27H, m), 5.17 (1H, d,  $J=3.2\text{Hz}$ ), 5.24 (1H, d,  $J=4.5\text{Hz}$ ), 5.38 (1H, d,  $J=5.9\text{Hz}$ ), 6.5-6.9 (5H, m), 6.9-7.1 (3H, m), 7.2-7.46 (2H, m), 7.7-8.1 (3H, m), 8.83 (1H, s)

1 FAB-MASS :  $m/z = 1368$  ( $M^+ + Na$ )

10 Elemental Analysis Calcd. for  $C_{58}H_{84}N_9O_{24}SNa \cdot 5H_2O$  :  
C 48.50, N 6.60, S 8.78  
Found : C 48.47, H 6.83, N 8.78

CL Example 7

15 IR (KBr) : 3350, 1666, 1502, 1199  $\text{cm}^{-1}$   
16 NMR (DMSO- $d_6$ ,  $\delta$ ) : 0.86 (3H, t,  $J=6.6\text{Hz}$ ), 0.97 (3H, d,  $J=6.7\text{Hz}$ ), 1.06 (3H, d,  $J=5.7\text{Hz}$ ), 1.2-1.5 (10H, m), 1.55-2.0 (5H, m), 2.1-2.6 (4H, m), 3.17 (1H, m), 3.7-4.5 (15H, m), 4.7-5.22 (10H, m), 5.24 (1H, d,  $J=4.4\text{Hz}$ ), 5.60 (1H, d,  $J=5.9\text{Hz}$ ), 6.68-7.03 (8H, m), 7.04 (1H, s), 7.2-7.42 (2H, m), 7.85-8.1 (3H, m), 8.83 (1H, s)

20 FAB-MASS :  $m/z = 1229$  ( $M^+ + Na$ )  
21 Elemental Analysis Calcd. for  $C_{50}H_{71}N_8O_{23}SNa \cdot 5H_2O$  :  
C 46.29, H 6.29, N 8.64  
Found : C 46.39, H 6.05, N 8.72

CL Example 8

30 IR (KBr) : 3350, 1666, 1631, 1513  $\text{cm}^{-1}$   
31 NMR (DMSO- $d_6$ ,  $\delta$ ) : 0.88 (3H, t,  $J=6.2\text{Hz}$ ), 0.97 (3H, d,  $J=6.7\text{Hz}$ ), 1.04 (3H, d,  $J=5.7\text{Hz}$ ), 1.2-1.58 (8H, m), 1.58-2.0 (5H, m), 2.0-2.6 (4H, m), 3.17 (1H, m), 3.6-4.5 (15H, m), 4.63-5.33 (13H, m), 5.53 (1H, d,  $J=5.9\text{Hz}$ ), 6.73 (1H, d,  $J=8.2\text{Hz}$ ), 6.82 (1H, d,  $J=8.2\text{Hz}$ ), 6.84 (1H, s), 6.95-7.52 (7H, m), 7.66 (1H, d,  $J=7.6\text{Hz}$ ), 7.7-7.9 (3H, m),

8.05 (1H, d, J=9.1Hz), 8.15 (1H, d, J=7.6Hz),  
8.85 (1H, s)

P FAB-MASS : m/z = 1279 (M<sup>+</sup>+Na)

P Elemental Analysis Calcd. for C<sub>54</sub>H<sub>73</sub>N<sub>8</sub>O<sub>23</sub>SNa·5H<sub>2</sub>O :

C 48.14, H 6.21, N 8.32

Found : C 48.43, H 6.28, N 8.30

5

CL

Example 9

P IR (KBr) : 3347, 2956, 1664, 1633, 1508, 1444, 1268,  
10 1047 cm<sup>-1</sup>

P NMR (DMSO-d<sub>6</sub>, δ) : 0.9-1.1 (9H, m), 1.06 (3H, d,  
J=5.9Hz), 1.3-1.5 (8H, m), 1.6-2.0 (7H, m), 2.1-  
2.4 (3H, m), 2.5-2.6 (1H, m), 3.1-3.3 (1H, m),  
3.6-4.4 (17H, m), 4.7-5.0 (8H, m), 5.09 (1H, d,  
15 J=5.5Hz), 5.16 (1H, d, J=3.1Hz), 5.24 (1H, d,  
J=4.5Hz), 6.73 (1H, d, J=8.2Hz), 6.8-6.9 (2H,  
m), 6.98 (1H, d, J=8.3Hz), 7.05 (1H, d,  
J=1.7Hz), 7.3-7.6 (5H, m), 8.08 (1H, d,  
J=8.9Hz), 8.25 (1H, d, J=8.4Hz), 8.54 (1H, d,  
20 J=7.5Hz), 8.83 (1H, s)

P FAB-MASS : m/z = 1257 (M<sup>+</sup>+Na)

P Elemental Analysis Calcd. for C<sub>52</sub>H<sub>75</sub>N<sub>8</sub>O<sub>23</sub>SNa·4H<sub>2</sub>O :

C 47.78, H 6.40, N 8.57

Found : C 47.88, H 6.71, N 8.53

25

CL

Example 10

P IR (KBr) : 3350, 2931, 1664, 1625, 1529, 1440, 1276,  
1226, 1047 cm<sup>-1</sup>

P NMR (DMSO-d<sub>6</sub>, δ) : 0.86 (3H, t, J=6.8Hz), 0.97 (3H,  
30 d, J=6.7Hz), 1.12 (3H, d, J=5.9Hz), 1.2-1.5  
(10H, m), 1.6-2.1 (5H, m), 2.1-2.4 (4H, m), 3.1-  
3.3 (1H, m), 3.5-4.6 (15H, m), 4.7-5.0 (3H, m),  
5.0-5.2 (7H, m), 5.27 (1H, d, J=4.4Hz), 5.55  
(1H, d, J=5.7Hz), 6.73 (1H, d, J=8.2Hz), 6.8-7.0  
35 (2H, m), 7.0-7.2 (4H, m), 7.3-7.6 (2H, m), 7.90

(1H, d, J=8.8Hz), 8.0-8.2 (2H, m), 8.8-8.9 (2H, m), 9.06 (1H, d, J=7.2Hz)

⌈ FAB-MASS : m/z = 1281 (M<sup>+</sup>+Na)

⌈ Elemental Analysis Calcd. for C<sub>53</sub>H<sub>71</sub>N<sub>8</sub>O<sub>24</sub>SNa·5H<sub>2</sub>O :

5 C 47.18, H 6.05, N 8.30

Found : C 46.97, H 6.27, N 8.22

CL Example 11

⌈ NMR (DMSO-d<sub>6</sub>, δ) : 0.87-1.05 (6H, m), 1.10 (3H, d, J=5.7Hz), 1.3-1.5 (4H, m), 1.6-1.9 (5H, m), 2.2-2.5 (3H, m), 2.6 (1H, m), 3.1-3.2 (1H, m), 3.7-4.5 (15H, m), 4.8-5.1 (8H, m), 5.09 (1H, d, J=5.64Hz), 5.16 (1H, d, J=3.2Hz), 5.26 (1H, d, J=4.2Hz), 5.52 (1H, d, J=6.0Hz), 6.73 (2H, d, J=8.4Hz), 6.8-6.9 (2H, m), 7.0-7.1 (3H, m), 7.2-7.4 (4H, m), 7.6-7.8 (6H, m), 8.11 (1H, d, J=8.4Hz), 8.29 (1H, d, J=8.4Hz), 8.51 (1H, d, J=7.7Hz), 8.85 (1H, s)

⌈ FAB-MASS : m/z = 1273 (M<sup>+</sup>+Na)

20 ⌈ Elemental Analysis Calcd. for C<sub>55</sub>H<sub>71</sub>N<sub>8</sub>O<sub>22</sub>SNa·4H<sub>2</sub>O :

C 49.92, H 6.02, N 8.47

Found : C 49.79, H 6.14, N 8.45

CL Example 12

25 ⌈ IR (KBr) : 3330, 2929, 1670, 1629, 1533, 1440, 1280, 1226, 1045, 804 cm<sup>-1</sup>

⌈ NMR (DMSO-d<sub>6</sub>, δ) : 0.86 (3H, t, J=6.7Hz), 0.97 (3H, d, J=6.7Hz), 1.08 (3H, d, J=5.9Hz), 1.2-1.6 (10H, m), 1.6-2.0 (5H, m), 2.1-2.5 (4H, m), 3.1-3.3 (1H, m), 3.6-4.5 (15H, m), 4.8-5.1 (9H, m), 5.17 (1H, d, J=3.0Hz), 5.25 (1H, d, J=4.5Hz), 5.56 (1H, d, J=5.6Hz), 6.73 (1H, d, J=8.2Hz), 6.83 (1H, d, J=6.8Hz), 7.1-7.2 (3H, m), 7.3-7.5 (3H, m), 7.85 (1H, d, J=8.8Hz), 8.0-8.2 (3H, m), 8.84 (1H, s), 8.96 (1H, d, J=7.2Hz)

p FAB-MASS :  $m/z = 1269$  ( $M^+ + Na$ )

p Elemental Analysis Calcd. for  $C_{52}H_{71}N_8O_{22}S_2Na \cdot 4H_2O$  :  
C 47.34, H 6.04, N 8.49  
Found : C 47.21, H 5.96, N 8.41

5

CL

Example 13

p IR (KBr) : 3345, 2927, 1664, 1629, 1515, 1442,  
1274, 1047  $cm^{-1}$

10

p NMR (DMSO- $d_6$ ,  $\delta$ ) : 0.85 (3H, t,  $J=6.7Hz$ ), 0.97 (3H,  
d,  $J=6.7Hz$ ), 1.10 (3H, d,  $J=5.9Hz$ ), 1.2-1.4  
(10H, m), 1.5-2.5 (8H, m), 2.46 (3H, s), 2.69  
(2H, t,  $J=7.7Hz$ ), 3.1-3.4 (2H, m), 3.6-4.5 (17H,  
m), 4.8-5.2 (8H, m), 6.7-7.0 (3H, m), 7.05 (1H,  
d,  $J=1.7Hz$ ), 7.14 (1H, s), 7.3-7.6 (5H, m), 8.0-  
15 8.2 (2H, m), 8.47 (1H, d,  $J=7.0Hz$ ), 8.84 (1H, s)

p FAB-MASS :  $m/z = 1251$  ( $M^+ + Na$ )

p Elemental Analysis Calcd. for  $C_{53}H_{73}N_8O_{22}SNa \cdot 3H_2O$  :  
C 49.61, H 6.21, N 8.73  
Found : C 49.88, H 6.44, N 8.74

20

CL

Example 14

p IR (KBr) : 3340, 1672, 1627, 1542, 1513, 1440, 1268,  
1045  $cm^{-1}$

25

p NMR (DMSO- $d_6$ ,  $\delta$ ) : 0.84 (3H, t,  $J=6.7Hz$ ), 0.94 (3H,  
d,  $J=6.7Hz$ ), 1.07 (3H, d,  $J=6.0Hz$ ), 1.2-1.4  
(12H, m), 1.6-2.0 (5H, m), 2.1-2.4 (3H, m), 2.6  
(1H, m), 2.96 (2H, t,  $J=7.4Hz$ ), 3.1-3.3 (1H, m),  
3.6-4.5 (13H, m), 4.7-5.2 (11H, m), 5.50 (1H, d,  
 $J=5.7Hz$ ), 6.73 (1H, d,  $J=8.2Hz$ ), 6.8-6.9 (2H,  
30 m), 7.04 (1H, s), 7.2-7.5 (3H, m), 7.72 (1H, d,  
 $J=8.5Hz$ ), 7.91 (1H, d,  $J=8.4Hz$ ), 8.05 (1H, d,  
 $J=8.4Hz$ ), 8.2-8.4 (1H, m), 8.80 (1H, d,  
 $J=7.7Hz$ ), 8.83 (1H, s)

35

p FAB-MASS :  $m/z = 1252$  ( $M^+ + Na$ )

p Elemental Analysis Calcd. for  $C_{52}H_{72}N_9O_{22}SNa \cdot 6H_2O$  :

C 46.67, H 6.33, N 9.42

Found : C 46.72, H 6.53, N 9.45

CL Example 15

5 P IR (KBr) : 3350, 2935, 1664, 1627, 1517, 1446, 1251,  
1045  $\text{cm}^{-1}$

P NMR (DMSO- $\text{d}_6$ ,  $\delta$ ) : 0.90-1.1 (6H, m), 1.10 (3H, d,  
J=5.9Hz), 1.2-1.4 (6H, m), 1.6-2.4 (8H, m), 2.6-  
2.7 (1H, m), 3.1-3.3 (1H, m), 3.7-4.5 (16H, m),  
10 4.7-5.4 (11H, m), 5.51 (1H, d, J=5.6Hz), 6.7-7.0  
(3H, m), 7.0-7.6 (7H, m), 7.74 (1H, d, J=8.6Hz),  
8.0-8.4 (5H, m), 8.7-8.8 (1H, m), 8.84 (1H, s)

P FAB-MASS :  $m/z$  = 1301 ( $\text{M}^+$ +Na)

P Elemental Analysis Calcd. for  $\text{C}_{55}\text{H}_{71}\text{N}_{10}\text{O}_{22}\text{SNa}\cdot 6\text{H}_2\text{O}$  :  
15 C 47.62, H 6.03, N 10.01  
Found : C 47.65, H 6.03, N 10.03

CL Example 16

P IR (Nujol) : 3353, 1668, 1627, 1540, 1515, 1500  $\text{cm}^{-1}$

20 P NMR (DMSO- $\text{d}_6$ ,  $\delta$ ) : 0.80-1.00 (6H, m), 1.06 (3H, d,  
J=5.9Hz), 1.20-1.53 (4H, m), 1.60-1.95 (5H, m),  
2.00-2.65 (8H, m), 2.80 (2H, t, J=7.5Hz), 3.05-  
3.45 (1H, m), 3.50-3.85 (2H, m), 3.90-4.48 (11H,  
m), 4.65-5.38 (11H, m), 5.47 (1H, d, J=6.0Hz),  
25 6.65-6.90 (2H, m), 6.90-7.10 (2H, m), 7.10-7.65  
(11H, m), 7.90-8.25 (2H, m), 8.30 (1H, d,  
J=7.8Hz), 8.84 (1H, s)

P FAB-MASS :  $m/z$  = 1275.3 ( $\text{M}^+$ +Na)

P Elemental Analysis Calcd. for  $\text{C}_{55}\text{H}_{73}\text{N}_8\text{O}_{22}\text{SNa}\cdot 3\text{H}_2\text{O}$  :  
30 C 50.53, H 6.09, N 8.57  
Found : C 50.48, H 6.39, N 8.57

CL Example 17

P IR (Nujol) : 3351, 1656, 1623, 1538, 1515  $\text{cm}^{-1}$

35 P NMR (DMSO- $\text{d}_6$ ,  $\delta$ ) : 0.86 (3H, t, J=6.7Hz), 0.96 (3H,

d, J=6.7Hz), 1.08 (3H, d, J=5.8Hz), 1.15-1.40  
(8H, m), 1.50-2.00 (5H, m), 2.10-2.48 (4H, m),  
2.52-2.70 (2H, m), 3.05-3.28 (1H, m), 3.60-4.50  
(13H, m), 4.70-5.20 (9H, m), 5.25 (1H, d,  
5 J=4.6Hz), 5.52 (1H, d, J=6.0Hz), 6.68-6.92 (4H,  
m), 7.04 (1H, d, J=1.0Hz), 7.22-7.50 (5H, m),  
7.55-7.82 (7H, m), 8.14 (1H, d, J=8.4Hz), 8.31  
(1H, d, J=8.4Hz), 8.54 (1H, d, J=7.7Hz), 8.84  
(1H, s)  
10 P FAB-MASS : m/z = 1285 (M<sup>+</sup>+Na)

CL Example 18

P IR (Nujol) : 3351, 1668, 1627, 1540, 1515 cm<sup>-1</sup>  
P NMR (DMSO-d<sub>6</sub>, δ) : 0.87 (3H, t, J=6.8Hz), 0.96 (3H,  
15 d, J=6.7Hz), 1.06 (3H, d, J=5.8Hz), 1.17-1.48  
(4H, m), 1.50-1.95 (5H, m), 2.05-2.70 (8H, m),  
2.70-2.95 (2H, m), 3.05-3.30 (1H, m), 3.60-3.90  
(2H, m), 3.90-4.50 (11H, m), 4.65-5.10 (9H, m),  
5.15 (1H, d, J=3.2Hz), 5.23 (1H, d, J=4.2Hz),  
20 5.48 (1H, d, J=6.0Hz), 6.67-6.90 (3H, m), 7.03  
(1H, d, J=1.5Hz), 7.15-7.80 (11H, m), 8.00-8.20  
(2H, m), 8.29 (1H, d, J=7.8Hz), 8.84 (1H, s)  
P FAB-MASS : m/z = 1259 (M<sup>+</sup>+Na)

P Elemental Analysis Calcd. for C<sub>55</sub>H<sub>73</sub>N<sub>8</sub>O<sub>21</sub>SNa·6H<sub>2</sub>O :  
25 C 50.30, H 6.52, N 8.53  
Found : C 50.42, H 6.50, N 8.45

CL Example 19

P IR (Nujol) : 3351, 1668, 1652, 1623, 1540 cm<sup>-1</sup>  
30 P NMR (DMSO-d<sub>6</sub>, δ) : 0.87 (3H, t, J=6.7Hz), 0.96 (3H,  
d, J=6.7Hz), 1.07 (3H, d, J=6.0Hz), 1.25-1.45  
(4H, m), 1.50-2.00 (5H, m), 2.05-2.48 (4H, m),  
2.50-2.75 (2H, m), 3.60-4.50 (13H, m), 4.68-5.25  
(10H, m), 5.27 (1H, d, J=4.5Hz), 5.53 (1H, d,  
35 J=6.0Hz), 6.67-6.98 (4H, m), 7.05 (1H, d,

$J=1.0\text{Hz}$ ), 7.22-7.58 (5H, m), 7.58-7.90 (7H, m),  
8.16 (1H, d,  $J=9.0\text{Hz}$ ), 8.34 (1H, d,  $J=8.4\text{Hz}$ ),  
8.57 (1H, d,  $J=7.7\text{Hz}$ ), 8.85 (1H, s)

⌋ FAB-MASS :  $m/z = 1258$  ( $M^+ + \text{Na}$ )

5 ⌋ Elemental Analysis Calcd. for  $\text{C}_{55}\text{H}_{71}\text{N}_8\text{O}_{21}\text{SNa}\cdot 5\text{H}_2\text{O}$  :

C 49.84, H 6.15, N 8.45

Found : C 49.77, H 6.27, N 8.39

CL

Example 20

10 ⌋ IR (Nujol) : 3353, 1670, 1629, 1540, 1508  $\text{cm}^{-1}$

⌋ NMR ( $\text{DMSO}-d_6$ ,  $\delta$ ) : 0.88 (3H, t,  $J=6.5\text{Hz}$ ), 0.97 (3H,  
d,  $J=6.8\text{Hz}$ ), 1.04 (3H, d,  $J=5.9\text{Hz}$ ), 1.20-1.58  
(8H, m), 1.60-1.96 (5H, m), 2.08-2.60 (6H, m),  
2.70-3.00 (2H, m), 3.00-3.40 (1H, m), 3.60-3.85  
15 (2H, m), 3.85-4.50 (13H, m), 4.50-5.60 (12H, m),  
6.65-6.90 (3H, m), 7.00-7.15 (3H, m), 7.18-7.50  
(4H, m), 7.59 (1H, s), 7.62-7.78 (2H, m), 7.95-  
8.20 (2H, m), 8.30 (1H, d,  $J=7.7\text{Hz}$ ), 8.83 (1H,  
s)

20 ⌋ FAB-MASS :  $m/z = 1277$  ( $M^+ + \text{Na}$ )

⌋ Elemental Analysis Calcd. for  $\text{C}_{55}\text{H}_{75}\text{N}_8\text{O}_{22}\text{SNa}\cdot 4\text{H}_2\text{O}$  :

C 49.77, H 6.30, N 8.44

Found : C 49.67, H 6.31, N 8.40

25 CL

Example 21

⌋ IR (Nujol) : 3351, 1654, 1623, 1538, 1515  $\text{cm}^{-1}$

⌋ NMR ( $\text{DMSO}-d_6$ ,  $\delta$ ) : 0.87 (3H, t,  $J=6.7\text{Hz}$ ), 0.97 (3H,  
d,  $J=6.7\text{Hz}$ ), 1.08 (3H, d,  $J=5.9\text{Hz}$ ), 1.20-1.58  
(8H, m), 1.66-1.95 (5H, m), 2.10-2.60 (4H, m),  
30 3.09-3.30 (1H, m), 3.58-4.60 (15H, m), 4.69-5.20  
(10H, m), 5.24 (1H, d,  $J=4.5\text{Hz}$ ), 5.51 (1H, d,  
 $J=6.0\text{Hz}$ ), 6.68-6.95 (4H, m), 7.04 (1H, d,  
 $J=1.0\text{Hz}$ ), 7.10-7.73 (7H, m), 7.73-7.90 (2H, m),  
7.98 (1H, d,  $J=1.9\text{Hz}$ ), 8.10 (1H, d,  $J=8.4\text{Hz}$ ),  
35 8.32 (1H, d,  $J=8.4\text{Hz}$ ), 8.50 (1H, d,  $J=7.7\text{Hz}$ ),

8.84 (1H, s)

⌈ FAB-MASS :  $m/z = 1275$  ( $M^+ + Na$ )

⌈ Elemental Analysis Calcd. for  $C_{55}H_{73}N_8O_{22}SNa \cdot 5H_2O$  :

C 50.38, H 6.38, N 8.55

5

Found : C 49.98, H 6.37, N 8.41

CL

Example 22

⌈ IR (KBr) : 3340, 2931, 1664, 1627, 1531, 1444, 1278,  
1047  $cm^{-1}$

10 ⌈ NMR (DMSO- $d_6$ ,  $\delta$ ) : 0.86 (3H, t,  $J=6.6Hz$ ), 0.96 (3H,  
d,  $J=6.8Hz$ ), 1.08 (3H, d,  $J=5.9Hz$ ), 1.2-1.4 (6H,  
m), 1.5-1.7 (2H, m), 1.7-2.1 (3H, m), 2.2-2.4  
(3H, m), 2.6-2.7 (3H, m), 3.1-3.2 (1H, m), 3.7-  
4.6 (13H, m), 4.78 (1H, d,  $J=6.0Hz$ ), 4.8-5.1  
15 (1H, m), 5.09 (1H, d,  $J=5.6Hz$ ), 5.16 (1H, d,  
 $J=3.2Hz$ ), 5.24 (1H, d,  $J=4.4Hz$ ), 5.52 (1H, d,  
 $J=6.0Hz$ ), 6.73 (1H, d,  $J=8.2Hz$ ), 6.83 (2H, d,  
 $J=8.3Hz$ ), 7.05 (1H, s), 7.3-7.5 (5H, m), 7.65  
(2H, d,  $J=8.2Hz$ ), 7.74 (2H, d,  $J=8.4Hz$ ), 7.98  
20 (2H, d,  $J=8.4Hz$ ), 8.11 (1H, d,  $J=8.4Hz$ ), 8.31  
(1H, d,  $J=8.4Hz$ ), 8.79 (1H, d,  $J=7.7Hz$ ), 8.84  
(1H, s)

⌈ FAB-MASS :  $m/z = 1245$  ( $M^+ + Na$ )

⌈ Elemental Analysis Calcd. for  $C_{54}H_{71}N_8O_{21}SNa \cdot 4H_2O$  :

25

C 50.07, H 6.15, N 8.65

Found : C 50.26, H 6.44, N 8.67

CL

Example 23

30 ⌈ NMR (DMSO- $d_6$ ,  $\delta$ ) : 0.91 (3H, t,  $J=6.7Hz$ ), 0.96 (3H,  
d,  $J=6.8Hz$ ), 1.05 (3H, d,  $J=5.6Hz$ ), 1.2-1.5 (6H,  
m), 1.6-2.1 (5H, m), 2.1-2.7 (4H, m), 3.0-3.5  
(9H, m), 3.6-4.5 (15H, m), 4.6-5.6 (11H, m),  
6.73 (1H, d,  $J=8.2Hz$ ), 6.8-6.9 (4H, m), 6.95  
(2H, d,  $J=8.6Hz$ ), 7.02 (2H, d,  $J=9.2Hz$ ), 7.04  
35 (1H, s), 7.2-7.5 (3H, m), 7.82 (2H, d,  $J=8.6Hz$ ),



8.06 (1H, d, J=8Hz), 8.25 (1H, d, J=6.7Hz), 8.43  
(1H, d, J=6.7Hz), 8.85 (1H, s)

IR (KBr) : 3350, 1668, 1629, 1510  $\text{cm}^{-1}$

FAB-MASS : m/z = 1345 (M+Na)

5. Elemental Analysis Calcd. for  $\text{C}_{58}\text{H}_{79}\text{N}_{10}\text{O}_{22}\text{SNa}\cdot 6\text{H}_2\text{O}$  :  
C 48.67, H 6.41, N 9.78  
Found : C 48.80, H 6.46, N 9.82

Example 24

10 Major product

IR (KBr) : 3350, 1668, 1631, 1047  $\text{cm}^{-1}$

NMR ( $\text{DMSO-d}_6$ ,  $\delta$ ) : 0.96 (3H, d, J=6.7Hz), 1.08 (3H,  
d, J=5.7Hz), 1.2-1.6 (10H, m), 1.6-2.4 (8H, m),  
2.5-2.7 (1H, m), 3.18 (1H, m), 3.21 (3H, s),  
3.29 (2H, t, J=6.4Hz), 3.6-3.83 (2H, m), 3.83-  
4.6 (13H, m), 4.7-5.4 (11H, m), 5.51 (1H, d,  
J=5.9Hz), 6.73 (1H, d, J=8.2Hz), 6.83 (1H, d,  
J=8.2Hz), 6.85 (1H, s), 7.04 (2H, d, J=8.4Hz),  
7.06 (1H, s), 7.31 (1H, s), 7.2-7.5 (2H, m),  
7.67 (2H, d, J=8.4Hz), 7.71 (2H, d, J=8.4Hz),  
7.96 (2H, d, J=8.4Hz), 8.06 (1H, d, J=8Hz), 8.25  
(1H, d, J=6.7Hz), 8.74 (1H, d, J=6.7Hz), 8.84  
(1H, s)

FAB-MASS : m/z = 1319 (M+Na)

- 25 Elemental Analysis Calcd. for  $\text{C}_{57}\text{H}_{77}\text{N}_8\text{O}_{23}\text{SNa}\cdot 4\text{H}_2\text{O}$  :  
C 49.99, H 6.26, N 8.18  
Found : C 49.74, H 6.27, N 8.06

Minor product

IR (KBr) : 3350, 1668, 1631  $\text{cm}^{-1}$

NMR ( $\text{DMSO-d}_6$ ,  $\delta$ ) : 0.96 (3H, d, J=6.7Hz), 1.08 (3H,  
d, J=5.7Hz), 1.2-1.6 (6H, m), 1.6-2.1 (7H, m),  
2.1-2.5 (3H, m), 2.5-2.7 (1H, m), 3.18 (1H, m),  
3.6-3.8 (2H, m), 3.8-4.6 (13H, m), 4.6-5.2 (12H,  
m), 5.26 (1H, d, J=4.6Hz), 5.53 (1H, d,

J=5.8Hz), 5.6-6.0 (1H, m), 6.73 (1H, d, J=8.2Hz), 6.83 (1H, d, J=8.3Hz), 6.85 (1H, s), 7.04 (2H, d, J=8.5Hz), 7.06 (1H, s), 7.30 (1H, s), 7.2-7.5 (2H, m), 7.68 (2H, d, J=8.5Hz), 7.72 (2H, d, J=8.5Hz), 7.96 (2H, d, J=8.5Hz), 8.06 (1H, d, J=8Hz), 8.25 (1H, d, J=6.7Hz), 8.74 (1H, d, J=6.7Hz), 8.85 (1H, s)

⌈ FAB-MASS : m/z = 1287 (M+Na)

⌈ Elemental Analysis Calcd. for  $C_{56}H_{73}N_8NaO_{22}S \cdot 7H_2O$  :  
C 48.34, H 6.30, N 8.05  
Found : C 48.19, H 6.19, N 7.99

CL  
Example 25

⌈ IR (KBr) : 3350, 2935, 2873, 1668, 1629, 1538, 1506, 1438, 1257, 1049  $cm^{-1}$

⌈ NMR (DMSO- $d_6$ ,  $\delta$ ) : 0.9-1.0 (6H, m), 1.08 (3H, d, J=5.7Hz), 1.2-1.6 (4H, m), 1.6-2.0 (5H, m), 2.1-2.4 (3H, m), 2.5-2.6 (1H, m), 3.1-3.2 (1H, m), 3.6-4.6 (15H, m), 4.7-5.2 (10H, m), 5.26 (1H, d, J=4.5Hz), 5.55 (1H, d, J=5.9Hz), 6.7-6.9 (3H, m), 7.0-7.6 (7H, m), 7.85 (2H, d, J=8.6Hz), 7.9-8.2 (4H, m), 8.26 (1H, d, J=7.7Hz), 8.8-9.0 (2H, m)

⌈ FAB-MASS : m/z = 1314.3 (M+Na)<sup>+</sup>

⌈ Elemental Analysis Calcd. for  $C_{56}H_{70}N_9O_{23}NaS \cdot 7H_2O$  :  
C 47.42, H 5.97, N 8.89  
Found : C 47.33, H 5.85, N 8.73

CL  
Example 26

30 To a solution of The Starting Compound (1 g) and succinimido 4-(4-octyloxyphenyl)piperazine-1-carboxylate (0.45 g) in N,N-dimethylformamide (10 ml) was added 4-dimethylaminopyridine (0.141 g), and stirred for 5 days at 50°C. The reaction mixture was pulverized with ethyl  
35 acetate. The precipitate was collected by filtration, and

dried under reduced pressure. The powder was dissolved in water, and subjected to column chromatography on ion exchange resin (DOWEX-50WX4) eluting with water. The fractions containing the object compound were combined, and subjected to column chromatography on ODS (YMC-gel-ODS-AM-S-50) eluting with 50% acetonitrile aqueous solution. The fractions containing the object compound were combined, and evaporated under reduced pressure to remove acetonitrile. The residue was lyophilized to give crude The Object Compound (23). The powder of crude The Object Compound (23) was purified by preparative HPLC utilizing a C<sub>18</sub>  $\mu$  Bondapak resin (Waters Associates, Inc.) which was eluted with a solvent system comprised of (acetonitrile-pH 3 phosphate buffer = 40:60) at a flow rate of 80 ml/minute using a Shimadzu LC-8A pump. The column was monitored by a UV detector set at 240 nm. The fractions containing the object compound were combined, and evaporated under reduced pressure to remove acetonitrile. The residue was subjected to column chromatography on ion exchange resin (DOWEX-50WX4) eluting with water. The fractions containing the object compound were combined, and subjected to column chromatography on ODS (YMC-gel-ODS-AM-S-50) eluting with 50% acetonitrile aqueous solution. The fractions containing the object compound were combined, and evaporated under reduced pressure to remove acetonitrile. The residue was lyophilized to give The Object Compound (23) (60 mg).

$\rho$  IR (KBr) : 3347, 1629, 1511, 1245 cm<sup>-1</sup>

$\rho$  NMR (DMSO-d<sub>6</sub>,  $\delta$ ) : 0.86 (3H, t, J=6.7Hz), 0.95 (3H, d, J=6.8Hz), 1.06 (3H, d, J=5.9Hz), 1.2-1.5 (10H, m), 1.55-1.92 (5H, m), 2.0-2.65 (4H, m), 2.8-3.05 (5H, m), 3.2-4.47 (17H, m), 4.6-5.6 (12H, m), 6.6-7.0 (7H, m), 7.03 (1H, s), 7.2-7.5 (3H, m), 7.9-8.3 (3H, m), 8.84 (1H, s)

$\rho$  FAB-MASS : m/z = 1297 (M<sup>+</sup>+Na)

Elemental Analysis Calcd. for  $C_{54}H_{79}N_{10}O_{22}SNa \cdot 6H_2O \cdot CH_3CN$ :  
C 47.22, H 6.65, N 10.82  
Found : C 47.58, H 7.05, N 10.85

5 Example 27

To a suspension of 1-hydroxybenzotriazole (0.53 g) and 2-(4-octyloxyphenoxy)acetic acid (1 g) in dichlormethane (30 ml) was added 1-ethyl-3-(3'-dimethylaminopropyl)carbodiimide hydrochloride (WSCD·HCl) (0.886 g), and stirred for 3 hours at ambient temperature. The reaction mixture was added to water. The organic layer was taken, and dried over magnesium sulfate. The magnesium sulfate was filtered off, and the filtrate was evaporated under reduced pressure to give 1-[2-(4-octyloxyphenoxy)acetyl]benzotriazole 3-oxide (892 mg). To a solution of The Starting Compound (1.79 g) and 1-[2-(4-octyloxyphenoxy)acetyl]benzotriazole 3-oxide (892 mg) in N,N-dimethylformamide (18 ml) was added 4-(N,N-dimethylamino)pyridine (0.297 g), and stirred for 12 hours at ambient temperature. The reaction mixture was pulverized with ethyl acetate. The precipitate was collected by filtration, and dried under reduced pressure. The powder was added to water, and subjected to ion-exchange column chromatography on DOWEX-50WX4, and eluted with water. The fractions containing the object compound were combined, and subjected to column chromatograph on ODS (YMC-gel-ODS-AM-S-50), and eluted with 50% methanol aqueous solution. The fractions containing the object compound were combined, and evaporated under reduced pressure to remove methanol. The residue was lyophilized to give The Object Compound (24) (1.75 g).

IR (KBr) : 3350, 1666, 1629, 1228  $cm^{-1}$

$^1H$  NMR (DMSO- $d_6$ ,  $\delta$ ) : 0.86 (3H, t, J=6.9Hz), 0.95 (3H, d, J=6.7Hz), 1.04 (3H, d, J=5.7Hz), 1.15-1.5 (10H, m), 1.55-2.0 (5H, m), 2.05-2.5 (4H, m),

3.16 (1H, m), 3.72 (2H, m), 3.88 (3H, t, J=6.3Hz), 4.41 (2H, s), 3.93-4.6 (11H, m), 4.69-5.25 (10H, m), 5.28 (1H, d, J=4.3Hz), 5.57 (1H, d, J=5.7Hz), 6.73 (1H, d, J=8.2Hz), 6.8-7.0 (5H, m), 7.04 (1H, s), 7.09 (1H, s), 7.3-7.4 (2H, m), 7.92-8.17 (2H, m), 8.29 (1H, d, J=7.5Hz), 8.84 (1H, s)

⌈ FAB-MASS :  $m/z = 1243$  ( $M^+ + Na$ )

⌈ Elemental Analysis Calcd. for  $C_{51}H_{73}N_8O_{23}SNa \cdot 4H_2O$  :

10  $C$  47.36,  $H$  6.31,  $N$  8.66

Found :  $C$  47.22,  $H$  6.44,  $N$  8.37

The Object Compounds (28) to (31) were obtained according to a similar manner to that of Example 27.

15

✓ Example 28

⌈ IR (KBr) : 3350, 2933, 1664, 1628, 1446, 1205, 1045  $cm^{-1}$

⌈ NMR (DMSO- $d_6$ ,  $\delta$ ) : 0.8-1.1 (9H, m), 1.2-2.0 (19H, m), 2.1-2.3 (3H, m), 3.6-3.8 (4H, m), 3.9-4.4 (13H, m), 4.6-5.0 (8H, m), 5.07 (1H, d, J=5.6Hz), 5.14 (1H, d, J=3.2Hz), 5.23 (1H, d, J=4.3Hz), 5.46 (1H, d, J=6.7Hz), 6.7-6.9 (3H, m), 7.04 (1H, s), 7.2-7.5 (6H, m), 7.8-8.0 (3H, m), 8.05 (1H, d, J=8.4Hz), 8.2-8.4 (2H, m), 8.83 (1H, s)

25

⌈ FAB-MASS :  $m/z = 1360$  ( $M^+ + Na$ )

⌈ Elemental Analysis Calcd. for  $C_{59}H_{80}N_9O_{23}SNa \cdot 6H_2O$  :

$C$  48.99,  $H$  6.41,  $N$  8.72

Found :  $C$  48.92,  $H$  6.37,  $N$  8.64

30

✓ Example 29

⌈ IR (KBr) : 3350, 2927, 1668, 1627, 1535, 1515, 1452, 1440, 1286, 1045  $cm^{-1}$

⌈ NMR (DMSO- $d_6$ ,  $\delta$ ) : 0.83 (3H, t, J=6.7Hz), 0.95 (3H, d, J=6.7Hz), 1.07 (3H, d, J=5.9Hz), 1.2-1.4

35

(12H, m), 1.6-2.0 (5H, m), 2.1-2.4 (3H, m), 2.6 (1H, m), 2.82 (2H, t,  $J=7.4\text{Hz}$ ), 3.1-3.2 (1H, m), 3.6-4.5 (13H, m), 4.7-5.2 (11H, m), 5.4-5.6 (1H, m), 6.72 (1H, d,  $J=8.2\text{Hz}$ ), 6.82 (2H, d,  $J=8.1\text{Hz}$ ), 7.03 (1H, s), 7.2-7.4 (3H, m), 7.47 (1H, d,  $J=8.5\text{Hz}$ ), 7.69 (1H, d,  $J=8.5\text{Hz}$ ), 8.1-8.2 (2H, m), 8.23 (1H, d,  $J=8.4\text{Hz}$ ), 8.62 (1H, d,  $J=7.8\text{Hz}$ ), 8.83 (1H, s)

5  
10  
FAB-MASS :  $m/z = 1251 (M^+ + Na)$   
Elemental Analysis Calcd. for  $C_{52}H_{73}N_{10}O_{21}SNa \cdot 5H_2O$  :  
C 47.34, H 6.34, N 10.61  
Found : C 47.30, H 6.45, N 10.45

CL Example 30

15  
20  
NMR (DMSO- $d_6$ ,  $\delta$ ) : 0.86 (3H, t,  $J=6.8\text{Hz}$ ), 0.96 (3H, t,  $J=6.7\text{Hz}$ ), 1.05 (3H, t,  $J=5.8\text{Hz}$ ), 1.2-1.5 (10H, m), 1.6-2.0 (5H, m), 2.2-2.4 (3H, m), 2.5-2.6 (1H, m), 3.1-3.2 (1H, m), 3.7-4.5 (15H, m), 4.7-5.0 (8H, m), 5.10 (1H, d,  $J=5.6\text{Hz}$ ), 5.17 (1H, d,  $J=3.1\text{Hz}$ ), 5.26 (1H, d,  $J=4.5\text{Hz}$ ), 5.52 (1H, d,  $J=5.8\text{Hz}$ ), 6.73 (1H, d,  $J=8.2\text{Hz}$ ), 6.8-7.0 (3H, m), 7.04 (1H, s), 7.2-7.4 (3H, m), 8.0-8.3 (3H, m), 8.68 (1H, d,  $J=2.3\text{Hz}$ ), 8.7-8.8 (1H, m), 8.85 (1H, m)

25  
FAB-MASS :  $m/z = 1214 (M^+ + Na)$   
Elemental Analysis Calcd. for  $C_{49}H_{70}N_9O_{22}SNa \cdot 4H_2O$  :  
C 46.55, H 6.22, N 9.97  
Found : C 46.29, H 6.18, N 9.71

30 CL Example 31

IR (Nujol) : 3342, 2210, 1668, 1623  $\text{cm}^{-1}$   
NMR (DMSO- $d_6$ ,  $\delta$ ) : 0.88 (3H, t,  $J=6.7\text{Hz}$ ), 0.97 (3H, d,  $J=6.7\text{Hz}$ ), 1.08 (3H, d,  $J=6.7\text{Hz}$ ), 1.20-1.60 (8H, m), 1.60-2.00 (5H, m), 2.05-2.50 (4H, m), 3.05-3.30 (1H, m), 3.60-4.60 (15H, m), 4.65-5.18

(10H, m), 5.24 (1H, d,  $J=4.5\text{Hz}$ ), 5.58 (1H, d,  $J=6.0\text{Hz}$ ), 6.68-7.10 (4H, m), 7.15-7.65 (5H, m), 7.80-8.30 (6H, m), 8.84 (1H, s), 9.18 (1H, d,  $J=7.7\text{Hz}$ )

5       $\rho$  FAB-MASS :  $m/z = 1273.5$  ( $M^+ + Na$ )

$\rho$  Example 32

To a solution of 6-heptyloxy-2-naphthoic acid (0.358 g) and triethylamine (0.174 ml) in N,N-dimethylformamide (10 ml) was added diphenylphosphoryl azide (0.4 ml), and stirred for an hour at ambient temperature. Then, the reaction mixture was stirred for an hour at 100°C. After cooling, to the reaction mixture was added The Starting Compound (1 g) and 4-(N,N-dimethylamino)pyridine (0.140 g), and stirred for 10 hours at ambient temperature. The reaction mixture was pulverized with ethyl acetate. The precipitate was collected by filtration, and dried under reduced pressure. The powder was dissolved in water, and subjected to column chromatography on ion exchange resin (DOWEX-50WX4) eluting with water. The fractions containing the object compound were combined, and subjected to column chromatography on ODS (YMC-gel-ODS-AM-S-50) eluting with 50% acetonitrile aqueous solution. The fractions containing the object compound were combined, and evaporated under reduced pressure to remove acetonitrile. The residue was lyophilized to give The Object Compound (29) (0.832 g).

$\rho$  IR (KBr) : 3350, 1664, 1629, 1546, 1240  $\text{cm}^{-1}$

$\rho$  NMR (DMSO- $d_6$ ,  $\delta$ ) : 0.88 (3H, t,  $J=6.6\text{Hz}$ ), 0.97 (3H, d,  $J=6.7\text{Hz}$ ), 1.08 (3H, d,  $J=5.9\text{Hz}$ ), 1.2-1.55 (8H, m), 1.55-2.0 (5H, m), 2.1-2.5 (4H, m), 3.18 (1H, m), 3.6-3.8 (3H, m), 3.9-4.5 (13H, m), 4.7-4.95 (3H, m), 5.0-5.3 (7H, m), 5.59 (1H, d,  $J=5.8\text{Hz}$ ), 6.52 (1H, d,  $J=8.1\text{Hz}$ ), 6.73 (1H, d,  $J=8.2\text{Hz}$ ), 6.83 (1H, d,  $J=8.2\text{Hz}$ ), 6.90 (1H, s),

7.0-7.15 (3H, m), 7.20 (1H, s), 7.27-7.4 (3H, m), 7.6-7.7 (2H, m), 7.87 (1H, s), 7.95-8.2 (2H, m), 8.69 (1H, s), 8.85 (1H, s)

⌈ FAB-MS :  $m/z = 1264$  ( $M^+ + Na$ )

5 ⌈ Elemental Analysis Calcd. for  $C_{53}H_{72}N_9O_{22}SNa \cdot 5H_2O$  :

C 47.78, H 6.20, N 9.46

Found : C 47.65, H 6.42, N 9.34

The Object Compound (33) was obtained according to a  
10 similar manner to that of Example 32.

✓ Example 33

⌈ IR (KBr) : 3350, 1666, 1629, 1537, 1240  $cm^{-1}$

15 ⌈ NMR (DMSO- $d_6$ ,  $\delta$ ) : 0.87 (3H, t,  $J=6.7Hz$ ), 0.97 (3H, d,  $J=6.7Hz$ ), 1.09 (3H, d,  $J=5.8Hz$ ), 1.2-1.55 (8H, m), 1.55-2.0 (5H, m), 2.07-2.6 (4H, m), 3.18 (1H, m), 3.6-3.85 (3H, m), 3.9-4.5 (13H, m), 4.7-4.98 (3H, m), 5.0-5.3 (7H, m), 5.57 (1H, d,  $J=5.9Hz$ ), 6.50 (1H, d,  $J=8.1Hz$ ), 6.73 (1H, d,  $J=8.2Hz$ ), 6.82 (1H, dd,  $J=8.2$  and  $1.7Hz$ ), 6.87 (1H, s), 6.97 (2H, d,  $J=8.8Hz$ ), 7.05 (1H, d,  $J=1.7Hz$ ), 7.10 (1H, s), 7.23-7.43 (2H, m), 7.38 (2H, d,  $J=8.8Hz$ ), 7.50 (2H, d,  $J=8.8Hz$ ), 7.52 (2H, d,  $J=8.8Hz$ ), 8.0-8.15 (2H, m), 8.65 (1H, s), 8.84 (1H, s)

25 ⌈ FAB-MASS :  $m/z = 1290$  ( $M^+ + Na$ )

⌈ Elemental Analysis Calcd. for  $C_{55}H_{74}N_9O_{22}SNa \cdot 7H_2O$  :

C 47.38, H 6.36, N 9.04

Found : C 47.67, H 6.53, N 9.03

30

✓ Example 34

A solution of The Starting Compound (2.45 g), 3-[4-(4-pentylphenyl)phenyl]propionic acid (0.90 g), 1-ethyl-3-(3'-dimethylaminopropyl)carbodiimide hydrochloride (WSCD-HCl) (0.59 g) and triethylamine (0.43 ml) in N,N-



dimethylformamide (50 ml) was stirred for 15 hours at ambient temperature. The reaction mixture was diluted with ethyl acetate, and the resultant precipitate was collected by filtration, and washed in turn with ethyl acetate and diisopropyl ether, and dried under reduced pressure. The powder was dissolved in water, and was subjected to column chromatography on ion exchange resin (DOWEX-50WX4 (Na form, 50 ml)) eluting with water. The fractions containing the object compound were combined, and subjected to reversed phase chromatography on ODS (YMC-gel-ODS-AM-S-50, 50 ml) eluting with (water : acetonitrile = 10:0 - 7:3, V/V). The fractions containing the object compound were combined, and evaporated under reduced pressure to remove acetonitrile. The residue was lyophilized to give The Object Compound (31) (1.53 g).

IR (Nujol) : 3351, 2212, 1668, 1627  $\text{cm}^{-1}$

<sup>1</sup>H NMR (DMSO- $d_6$ ,  $\delta$ ) : 0.87 (3H, t,  $J=6.5\text{Hz}$ ), 0.96 (3H, d,  $J=6.7\text{Hz}$ ), 1.08 (3H, d,  $J=5.8\text{Hz}$ ), 1.20-1.50 (4H, m), 1.50-2.00 (5H, m), 2.03-2.55 (4H, m), 2.62 (2H, t,  $J=7.5\text{Hz}$ ), 3.17 (1H, t,  $J=8.4\text{Hz}$ ), 3.55-4.57 (15H, m), 4.65-5.13 (9H, m), 5.16 (1H, d,  $J=3.2\text{Hz}$ ), 5.24 (1H, d,  $J=4.5\text{Hz}$ ), 5.58 (1H, d,  $J=5.8\text{Hz}$ ), 6.67-6.90 (3H, m), 6.93-7.10 (2H, m), 7.15-7.50 (4H, m), 7.50-7.90 (6H, m), 8.06 (1H, d,  $J=8.4\text{Hz}$ ), 8.15 (1H, d,  $J=7.7\text{Hz}$ ), 8.84 (1H, s), 9.19 (1H, d,  $J=7.1\text{Hz}$ )

FAB-MASS :  $m/z$  = 1255 ( $M^+ + \text{Na}$ )

Elemental Analysis Calcd. for  $\text{C}_{55}\text{H}_{69}\text{N}_8\text{O}_{21}\text{SNa}\cdot 4\text{H}_2\text{O}$  :

C 50.61, H 5.95, N 8.58

Found : C 50.47, H 6.00, N 8.54

### Example 35

To a suspension of 1-hydroxybenzotriazole (501 mg) and 4-(4-heptylphenyl)benzoic acid (1 g) in dichloromethane (30 ml) was added 1-ethyl-3-(3'-

dimethylaminopropyl)carbodiimide hydrochloride (WSCD·HCl) (839 mg), and stirred for 3 hours at ambient temperature.

The reaction mixture was added to water. The organic layer was separated, and dried over magnesium sulfate.

5 The magnesium sulfate was filtered off, and the filtrate was evaporated under reduced pressure to give 1-[4-(4-heptylphenyl)benzoyl]benzotriazole 3-oxide. To a solution of The Starting Compound (2.49 g) and 1-[4-(4-

10 dimethylformamide (25 ml) was added 4-(N,N-dimethylamino)pyridine (381 mg), and stirred for 12 hours at ambient temperature. The reaction mixture was pulverized with ethyl acetate. The precipitate was collected by filtration, and dried under reduced pressure.

15 The residue was dissolved in water, and subjected to column chromatography on ion exchange resin (DOWEX-50WX4) eluting with water. The fraction containing the object compound were combined, and subjected to column chromatography on ODS (YMC-gel-ODS-AM-S-50) eluting with

20 30% acetonitrile aqueous solution. The fractions containing the object compound were combined, and evaporated under reduced pressure to remove acetonitrile. The residue was lyophilized to give The Object Compound (32) (1.99 g).

25  $\rho$  IR (Nujol) : 3350, 2852, 1749, 1621, 1457, 1376, 1045  $\text{cm}^{-1}$

$\rho$  NMR (DMSO- $d_6$ ,  $\delta$ ) : 0.86 (3H, t,  $J=6.7\text{Hz}$ ), 0.96 (3H, d,  $J=6.7\text{Hz}$ ), 1.08 (3H, d,  $J=5.9\text{Hz}$ ), 1.5-1.7 (2H, m), 1.7-2.2 (3H, m), 2.2-2.5 (3H, m), 2.6-2.8 (3H, m), 3.1-3.2 (1H, m), 3.7-4.6 (13H, m), 4.7-5.2 (8H, m), 5.12 (1H, d,  $J=5.5\text{Hz}$ ), 5.18 (1H, d,  $J=2.9\text{Hz}$ ), 5.27 (1H, d,  $J=4.4\text{Hz}$ ), 5.54 (1H, d,  $J=5.8\text{Hz}$ ), 6.7-6.9 (3H, m), 7.05 (1H, s), 7.2-7.4 (5H, m), 7.65 (2H, d,  $J=8.0\text{Hz}$ ), 7.74 (2H, d,  $J=8.3\text{Hz}$ ), 7.98 (2H, d,  $J=8.3\text{Hz}$ ), 8.11

(1H, d, J=8.7Hz), 8.28 (1H, d, J=8.4Hz), 8.78  
(1H, d, J=7.3Hz), 8.85 (1H, s)

⌘ FAB-MASS : m/z = 1259 (M<sup>+</sup>+Na)

⌘ Elemental Analysis Calcd. for C<sub>55</sub>H<sub>73</sub>N<sub>8</sub>O<sub>21</sub>SNa·5H<sub>2</sub>O :

5 C 49.77, H 6.30, N 8.44

Found : C 49.98, H 6.44, N 8.41

The Object Compounds (36) to (107) were obtained  
according to a similar manner to that of Example 1.

10

✓ Example 36

⌘ IR (KBr) : 3350, 1675.8, 1629.6, 1515.8 cm<sup>-1</sup>

⌘ NMR (DMSO-d<sub>6</sub>, δ) : 0.86 (6H, d, J=6.6Hz), 0.96 (3H, d,  
J=6.6Hz), 1.06 (3H, d, J=5.7Hz), 1.1-1.3 (2H, m),  
1.4-2.0 (6H, m), 2.0-2.7 (4H, m), 3.1-3.5 (9H, m),  
3.66 (2H, t, J=7.3Hz), 3.6-4.5 (13H, m), 4.7-5.6  
(12H, m), 6.73 (1H, d, J=8.3Hz), 6.82 (1H, d,  
J=8.3Hz), 6.8-6.9 (1H, m), 7.02 (2H, d, J=9.0Hz),  
7.04 (1H, s), 7.11 (2H, d, J=9.0Hz), 7.2-7.6 (3H,  
m), 7.50 (2H, d, J=9.0Hz), 7.82 (2H, d, J=9.0Hz),  
8.1 (1H, d, J=8.5Hz), 8.28 (1H, d, J=8.5Hz), 8.33  
(1H, s), 8.45 (1H, d, J=7.0Hz), 8.84 (1H, s)

15

20

⌘ FAB-MASS : m/z = 1412 (M+Na)

⌘ Elemental Analysis Calcd. for C<sub>60</sub>H<sub>80</sub>N<sub>13</sub>O<sub>22</sub>SNa·9H<sub>2</sub>O :

25 C 46.42, H 6.36, N 11.73

Found : C 46.64, H 6.43, N 11.62

✓ Example 37

⌘ IR (KBr) : 3350, 1668.1, 1629.6, 1268.9 cm<sup>-1</sup>

⌘ NMR (DMSO-d<sub>6</sub>, δ) : 0.85 (3H, t, J=6.6Hz), 0.96 (3H, d,  
J=6.7Hz), 1.07 (3H, d, J=5.9Hz), 1.2-1.4 (10H, m),  
1.4-2.0 (5H, m), 2.0-2.5 (4H, m), 2.61 (2H, t,  
J=7.2Hz), 3.1-3.3 (1H, m), 3.6-4.5 (13H, m), 4.40  
(2H, s), 4.6-5.3 (11H, m), 5.60 (1H, d, J=5.8Hz),  
6.73 (1H, d, J=8.2Hz), 6.82 (1H, d, J=8.2Hz), 6.6-

35

6.9 (1H, m), 7.04 (1H, s), 7.0-7.1 (1H, m), 7.32  
(2H, d, J=8.5Hz), 7.2-7.5 (2H, m), 7.58 (2H, d,  
J=8.5Hz), 7.93 (1H, d, J=7Hz), 8.04 (1H, d,  
J=9.4Hz), 8.41 (1H, s), 8.44 (1H, d, J=9.4Hz), 8.84  
(1H, s)

5  $\rho$  FAB-MASS : m/z = 1294 (M+Na)

$\rho$  Elemental Analysis Calcd. for  $C_{53}H_{74}N_{11}O_{22}SNa \cdot 7H_2O$  :

C 45.52, H 6.34, N 11.02

Found : C 45.47, H 6.27, N 10.93

10

CL

Example 38

$\rho$  Major product

$\rho$  IR (KBr) : 3349.7, 1670.1, 1627.6, 1508.1  $cm^{-1}$

15

$\rho$  NMR (DMSO- $d_6$ ,  $\delta$ ) : 0.96 (3H, d, J=6.6Hz), 1.06 (3H, d,  
J=5.7Hz), 1.2-1.6 (8H, m), 1.6-2.1 (5H, m), 2.1-2.7  
(4H, m), 3.0-3.2 (5H, m), 3.21 (3H, s), 3.30 (2H,  
t, J=6.5Hz), 3.3-3.5 (4H, m), 3.6-4.5 (15H, m),  
4.7-5.3 (11H, m), 5.49 (1H, d, J=5.9Hz), 6.73 (1H,  
d, J=8.3Hz), 6.8-6.9 (4H, m), 6.95 (2H, d,  
J=9.2Hz), 7.01 (2H, d, J=8.5Hz), 7.04 (1H, s), 7.20  
(1H, s), 7.2-7.5 (2H, m), 7.81 (2H, d, J=8.5Hz),  
8.09 (1H, d, J=8.7Hz), 8.28 (1H, d, J=8.7Hz), 8.45  
(1H, d, J=6.7Hz), 8.84 (1H, s)

20

$\rho$  FAB-MASS : m/z = 1389 (M+Na)

25

$\rho$  Elemental Analysis Calcd. for  $C_{60}H_{83}N_{10}O_{23}SNa \cdot 8H_2O$  :

C 47.68, H 6.60, N 9.27

Found : C 47.83, H 6.72, N 9.27

$\rho$  Minor product

30

$\rho$  IR (KBr) : 3338.2, 1646.9, 1511.9  $cm^{-1}$

$\rho$  NMR (DMSO- $d_6$ ,  $\delta$ ) : 0.96 (3H, d, J=6.7Hz), 1.06 (3H, d,  
J=5.7Hz), 1.3-1.6 (4H, m), 1.6-2.7 (11H, m), 3.0-  
3.2 (5H, m), 3.3-3.5 (4H, m), 3.6-4.5 (15H, m),  
4.7-5.3 (13H, m), 5.48 (1H, d, J=5.9Hz), 5.7-6.0  
(1H, m), 6.73 (1H, d, J=8.2Hz), 6.8-6.9 (4H, m),

35

6.94 (2H, d, J=9.3Hz), 7.01 (2H, d, J=8.6Hz), 7.04 (1H, s), 7.2-7.5 (3H, m), 7.81 (2H, d, J=8.6Hz), 8.06 (1H, d, J=8.7Hz), 8.25 (1H, d, J=8.7Hz), 8.42 (1H, d, J=6.7Hz), 8.84 (1H, s)

5     p FAB-MASS : m/z = 1357 (M+Na)

   p Elemental Analysis Calcd. for  $C_{59}H_{79}N_{10}O_{22}SNa \cdot 9H_2O$  :

          C 47.32, H 6.53, N 9.35

Found : C 47.08, H 6.66, N 9.25

10   Example 39

   p IR (KBr) : 3350, 1670.1, 1631.5, 1510.0, 1234.2  $cm^{-1}$

   p NMR (DMSO- $d_6$ ,  $\delta$ ) : 0.87 (3H, t, J=6.7Hz), 0.96 (3H, d, J=6.7Hz), 1.06 (3H, d, J=5.6Hz), 1.2-1.5 (8H, m), 1.6-2.1 (5H, m), 2.1-2.7 (4H, m), 3.0-3.3 (5H, m), 3.3-3.5 (4H, m), 3.6-3.8 (2H, m), 3.88 (2H, d, J=6.4Hz), 3.8-4.5 (11H, m), 4.7-5.1 (8H, m), 5.10 (1H, d, J=5.6Hz), 5.16 (1H, d, J=3.1Hz), 5.25 (1H, d, J=4.5Hz), 5.48 (1H, d, J=5.9Hz), 6.73 (1H, d, J=8.2Hz), 6.8-6.9 (4H, m), 6.94 (2H, d, J=9.3Hz), 7.01 (2H, d, J=8.7Hz), 7.04 (1H, s), 7.2-7.5 (3H, m), 7.81 (2H, d, J=8.7Hz), 8.06 (1H, d, J=8Hz), 8.25 (1H, d, J=6.7Hz), 8.43 (1H, d, J=6.7Hz), 8.85 (1H, s)

   p FAB-MASS : m/z = 1359 (M+Na)

25   p Elemental Analysis Calcd. for  $C_{59}H_{81}N_{10}O_{22}SNa \cdot 5H_2O$  :

          C 49.64, H 6.43, N 9.81

Found : C 49.49, H 6.54, N 9.72

Example 40

30   p IR (KBr) : 3355.5, 1670.1, 1627.6, 1510.0 1236.1  $cm^{-1}$

   p NMR (DMSO- $d_6$ ,  $\delta$ ) : 0.89 (6H, d, J=6.5Hz), 0.96 (3H, d, J=6.7Hz), 1.05 (3H, d, J=5.7Hz), 1.2-1.4 (2H, m), 1.5-2.1 (6H, m), 2.1-2.7 (4H, m), 3.0-3.6 (9H, m), 3.6-4.5 (15H, m), 4.5-5.4 (12H, m), 6.73 (1H, d, J=8.2Hz), 6.8-6.9 (4H, m), 6.96 (2H, d, J=9.6Hz),

35

7.02 (2H, d, J=8.7Hz), 7.05 (1H, s), 7.2-7.5 (3H, m), 7.82 (2H, d, J=8.7Hz), 8.08 (1H, d, J=8Hz), 8.27 (1H, d, J=6.7Hz), 8.46 (1H, d, J=6.7Hz), 8.85 (1H, s)

5  $\rho$  FAB-MASS : m/z = 1345 (M+Na)

$\rho$  Elemental Analysis Calcd. for  $C_{58}H_{79}N_{10}O_{22}SNa \cdot 8H_2O$  :  
C 47.47, H 6.52, N 9.54  
Found : C 47.47, H 6.54, N 9.51

10 Example 41

$\rho$  IR (KBr) : 3347.8, 1668.1, 1629.6, 1510.0, 1234.2  $cm^{-1}$

$\rho$  NMR (DMSO- $d_6$ ,  $\delta$ ) : 0.89 (3H, t, J=7.0Hz), 0.96 (3H, d, J=6.7Hz), 1.05 (3H, d, J=5.8Hz), 1.2-1.5 (4H, m), 1.6-2.1 (5H, m), 2.1-2.7 (4H, m), 3.0-3.6 (9H, m), 3.6-3.8 (2H, m), 3.8-4.5 (13H, m), 4.7-5.6 (12H, m), 6.73 (1H, d, J=8.2Hz), 6.8-6.9 (4H, m), 6.96 (2H, d, J=8.7Hz), 7.02 (2H, d, J=9.0Hz), 7.04 (1H, s), 7.2-7.5 (3H, m), 7.82 (2H, d, J=8.7Hz), 8.07 (1H, d, J=8Hz), 8.27 (1H, d, J=6.7Hz), 8.45 (1H, d, J=6.7Hz), 8.85 (1H, s)

$\rho$  FAB-MASS : m/z = 1331 (M+Na)

$\rho$  Elemental Analysis Calcd. for  $C_{57}H_{77}N_{10}O_{22}SNa \cdot 6H_2O$  :  
C 48.30, H 6.33, N 9.88  
Found : C 48.20, H 6.58, N 10.03

25 Example 42

$\rho$  Mixture product

$\rho$  IR (KBr) : 3344, 1670.1, 1631.5  $cm^{-1}$

$\rho$  NMR (DMSO- $d_6$ ,  $\delta$ ) : 0.96 (3H, d, J=6.7Hz), 1.08 (3H, d, J=5.9Hz), 1.2-1.5 (8H, m), 1.6-2.1 (7H, m), 2.1-2.7 (4H, m), 3.1-3.3 (1H, m), 3.6-4.5 (15H, m), 4.45 and 4.70 (2H, t, J=7.1Hz), 4.6-5.3 (11H, m), 5.52 (1H, d, J=5.9Hz), 6.73 (1H, d, J=8.2Hz), 6.83 (1H, d, J=8.2Hz), 6.85 (1H, s), 7.03 (2H, d, J=8.6Hz), 7.05 (1H, s), 7.2-7.5 (3H, m), 7.68 (2H, d,

J=8.6Hz), 7.71 (2H, d, J=8.4Hz), 7.96 (2H, d, J=8.4Hz), 8.12 (1H, d, J=8.5Hz), 8.30 (1H, d, J=7.0Hz)

⌘ FAB-MASS : m/z = 1357 (M+Na)

5 ⌘ Elemental Analysis Calcd. for  $C_{57}H_{75}N_{12}O_{22}SNa \cdot 4H_2O$  :

C 48.64, H 5.94, N 11.94

Found : C 48.91, H 5.88, N 11.86

CL

Example 43

10 ⌘ IR (KBr) : 3350, 1666.2, 1651.5  $cm^{-1}$

⌘ NMR (DMSO- $d_6$ ,  $\delta$ ) : 0.96 (3H, d, J=6.7Hz), 1.05 (6H, d, J=6.3Hz), 1.06 (3H, d, J=5.7Hz), 1.2-1.6 (10H, m), 1.6-2.1 (7H, m), 2.1-2.7 (6H, m), 2.8-3.0 (2H, m), 3.0-3.2 (1H, m), 3.4-3.7 (2H, m), 3.6-3.8 (2H, m), 15 3.8-4.5 (13H, m), 4.7-5.6 (12H, m), 6.73 (1H, d, J=8.2Hz), 6.8-7.0 (2H, m), 7.03 (2H, d, J=8.7Hz), 7.06 (1H, s), 7.2-7.5 (3H, m), 7.67 (2H, d, J=8.7Hz), 7.71 (2H, d, J=8.4Hz), 7.96 (2H, d, J=8.4Hz), 8.04 (1H, d, J=8.5Hz), 8.31 (1H, d, J=8.5Hz), 8.73 (1H, d, J=7.0Hz), 8.90 (1H, s)

⌘ FAB-MASS : m/z = 1402 (M+Na)

CL

Example 44

25 ⌘ IR (KBr pelet) : 3350, 2929, 2856, 1670, 1631, 1510, 1243, 1045  $cm^{-1}$

⌘ NMR (DMSO- $d_6$ ,  $\delta$ ) : 0.86 (3H, t, J=6.8Hz), 0.96 (3H, d, J=6.7Hz), 1.06 (3H, d, J=5.7Hz), 1.6-2.0 (5H, m), 2.2-2.5 (5H, m), 2.6-2.7 (1H, m), 3.0-3.3 (5H, m), 3.6-4.5 (19H, m), 4.77 (2H, d, J=5.9Hz), 4.8-5.1 30 (6H, m), 5.10 (1H, d, J=5.6Hz), 5.17 (1H, d, J=3.1Hz), 5.25 (1H, d, J=4.5Hz), 5.50 (1H, d, J=5.8Hz), 6.7-7.0 (8H, m), 7.04 (1H, s), 7.2-7.4 (3H, m), 8.0-8.2 (2H, m), 8.26 (1H, d, J=8.0Hz), 8.55 (1H, d, J=7.3Hz), 8.67 (1H, d, J=1.2Hz), 8.85 35 (1H, s)

P FAB-MASS :  $m/z = 1374.3$  ( $M+Na^+$ )

P Elemental Analysis Calcd. for  $C_{59}H_{82}N_{11}O_{22}NaS \cdot 5.5H_2O$  :  
C 48.82, H 6.46, N 10.61  
Found : C 48.89, H 6.74, N 10.50

5

CL

Example 45

P IR (KBr) : 3350, 2935, 1668, 1623, 1538, 1257, 1174,  
1047  $cm^{-1}$

10

P NMR (DMSO- $d_6$ ,  $\delta$ ) : 0.8-1.1 (6H, m), 1.09 (3H, d,  
J=5.7Hz), 1.2-1.6 (6H, m), 1.7-2.1 (5H, m), 2.2-2.4  
(3H, m), 2.5-2.6 (1H, m), 3.6-3.8 (2H, m), 3.8-4.6  
(14H, m), 4.8-5.2 (7H, m), 5.18 (1H, d, J=3.1Hz),  
5.26 (1H, d, J=4.5Hz), 5.54 (1H, d, J=5.8Hz), 6.7-  
7.5 (9H, m), 7.82 (1H, d, J=8.5Hz), 7.96 (1H, d,  
J=8.7Hz), 8.1-8.4 (5H, m), 8.8-9.0 (2H, m)

15

P FAB-MASS :  $m/z = 1302.6$  ( $M+Na^+$ )

P Elemental Analysis Calcd. for  $C_{55}H_{70}N_9O_{23}SNa \cdot 6H_2O$  :  
C 47.58, H 5.95, N 9.08  
Found : C 47.46, H 6.04, N 9.05

20

CL

Example 46

P IR (KBr) : 3355, 2958, 1670, 1627, 1521, 1247,  
1047  $cm^{-1}$

25

P NMR (DMSO- $d_6$ ,  $\delta$ ) : 0.9-1.0 (6H, m), 1.08 (3H, d,  
J=5.6Hz), 1.4-1.6 (2H, m), 1.7-2.1 (5H, m), 2.1-2.4  
(3H, m), 2.5-2.6 (1H, m), 3.1-3.3 (1H, m), 3.7-3.8  
(2H, m), 3.9-4.6 (13H, m), 4.8-5.1 (8H, m), 5.11  
(1H, d, J=5.6Hz), 5.17 (1H, d, J=3.1Hz), 5.26 (1H,  
d, J=4.5Hz), 5.54 (1H, d, J=5.9Hz), 6.7-6.9 (3H,  
m), 7.0-7.2 (3H, m), 7.3-7.5 (3H, m), 7.7-7.9 (8H,  
m), 8.02 (2H, d, J=8.4Hz), 8.08 (1H, d, J=8.4Hz),  
8.32 (1H, d, J=7.7Hz), 8.81 (1H, d, J=7.0Hz), 8.85  
(1H, s)

30

P FAB-MASS :  $m/z = 1309.3$  ( $M+Na$ )<sup>+</sup>

35

P Elemental Analysis Calcd. for  $C_{58}H_{71}N_8O_{22}NaS \cdot 6H_2O$  :



C 49.92, H 6.00, N 8.03

Found : C 49.92, H 5.97, N 8.03

CL Example 47

5 IR (KBr) : 3350, 2933, 1668, 1629, 1517, 1249,  
1045  $\text{cm}^{-1}$

10 NMR (DMSO- $\text{d}_6$ ,  $\delta$ ) : 0.88 (3H, t,  $J=6.7\text{Hz}$ ), 0.96 (3H, d,  $J=6.7\text{Hz}$ ), 1.08 (3H, d,  $J=5.8\text{Hz}$ ), 1.7-2.7 (8H, m), 3.1-3.3 (1H, m), 3.6-4.5 (16H, m), 4.7-5.2 (8H, m), 5.18 (1H, d,  $J=3.1\text{Hz}$ ), 5.27 (1H, d,  $J=4.5\text{Hz}$ ), 5.56 (1H, d,  $J=5.8\text{Hz}$ ), 6.7-7.0 (3H, m), 7.0-7.2 (3H, m), 7.2-7.5 (3H, m), 8.0-8.4 (6H, m), 8.85 (1H, s), 8.96 (1H, d,  $J=7.0\text{Hz}$ ), 9.07 (1H, s)

15 FAB-MASS :  $m/z = 1276.6$  ( $M+\text{Na}^+$ )

15 Elemental Analysis Calcd. for  $\text{C}_{54}\text{H}_{72}\text{N}_9\text{O}_{22}\text{NaS}\cdot 5\text{H}_2\text{O}$  :

C 48.25, H 6.15, N 9.38

Found : C 48.10, H 6.14, N 9.30

CL Example 48

20 IR (KBr) : 3350, 2931, 1668, 1629, 1537, 1049  $\text{cm}^{-1}$

20 NMR (DMSO- $\text{d}_6$ ,  $\delta$ ) : 0.86 (3H, t,  $J=6.9\text{Hz}$ ), 0.9-1.5 (16H, m), 1.6-2.4 (8H, m), 2.5-2.7 (1H, m), 3.1-3.3 (1H, m), 3.5-5.6 (25H, m), 6.6-7.4 (8H, m), 7.8-8.4 (6H, m), 8.7-9.0 (2H, m), 9.00 (1H, d,  $J=2.4\text{Hz}$ )

25 FAB-MASS :  $m/z = 1331.4$  ( $M+\text{Na}^+$ )

25 Elemental Analysis Calcd. for  $\text{C}_{56}\text{H}_{73}\text{N}_{10}\text{O}_{23}\text{NaS}\cdot 8\text{H}_2\text{O}$  :

C 46.28, H 6.17, N 9.64

Found : C 46.50, H 6.27, N 9.65

CL Example 49

30 IR (KBr pelet) : 3300, 2931, 1668, 1650, 1629, 1538, 1515, 1268, 1049  $\text{cm}^{-1}$

35 NMR (DMSO- $\text{d}_6$ ,  $\delta$ ) : 0.87 (3H, t,  $J=6.6\text{Hz}$ ), 0.97 (3H, d,  $J=6.7\text{Hz}$ ), 1.10 (3H, d,  $J=5.6\text{Hz}$ ), 1.2-1.4 (6H, m), 1.5-1.7 (2H, m), 1.7-2.1 (3H, m), 2.1-2.4 (3H, m), 2.6-2.7 (3H, m), 3.1-3.2 (1H, m), 3.7-3.9 (2H, m),

3.9-4.5 (12H, m), 4.8-5.1 (7H, m), 5.11 (1H, d, J=5.5Hz), 5.18 (1H, d, J=3.1Hz), 5.27 (1H, d, J=4.5Hz), 5.55 (1H, d, J=5.8Hz), 6.7-7.0 (3H, m), 7.06 (1H, s), 7.3-7.5 (5H, m), 7.72 (2H, d, J=8.2Hz), 7.9-8.2 (5H, m), 8.3-8.4 (4H, m), 8.9-9.0 (2H, m)

⌘ FAB-MASS :  $m/z = 1260.5$  ( $M+Na^+$ )

⌘ Elemental Analysis Calcd. for  $C_{61}H_{74}N_9O_{22}SNa \cdot 6H_2O$  :  
C 50.58, H 5.98, N 8.70

10 Found : C 50.34, H 6.16, N 8.55

✓ Example 50

⌘ IR (KBr) : 3369, 2958, 2935, 1670, 1629, 1525, 1473, 1247,  $1047\text{ cm}^{-1}$

15 ⌘ NMR (DMSO- $d_6$ ,  $\delta$ ) : 0.95 (3H, t, J=7.3Hz), 0.97 (3H, d, J=6.7Hz), 1.09 (3H, d, J=5.7Hz), 1.3-1.6 (2H, m), 1.7-2.1 (5H, m), 2.1-2.4 (3H, m), 2.5-2.6 (1H, m), 3.1-3.3 (1H, m), 3.7-4.6 (15H, m), 4.7-5.1 (8H, m), 5.10 (1H, d, J=5.6Hz), 5.18 (1H, d, J=3.1Hz), 5.26 (1H, d, J=4.4Hz), 5.56 (1H, d, J=5.7Hz), 6.7-7.0 (3H, m), 7.1-7.2 (3H, m), 7.2-7.4 (3H, m), 7.70 (2H, d, J=8.6Hz), 7.78 (2H, d, J=8.4Hz), 8.1-8.4 (6H, m), 8.85 (1H, s), 8.99 (1H, d, J=7.0Hz), 9.13 (1H, d, J=1.6Hz)

25 ⌘ FAB-MASS :  $m/z = 1310.1$  ( $M+Na$ )<sup>+</sup>

⌘ Elemental Analysis Calcd. for  $C_{57}H_{70}N_9O_{22}NaS \cdot 7H_2O$  :  
C 47.20, H 6.12, N 8.69  
Found : C 47.42, H 6.19, N 8.92

30 ✓ Example 51

⌘ IR (KBr) : 3351, 2937, 2875, 1670, 1627, 1533, 1245,  $1047\text{ cm}^{-1}$

⌘ NMR (DMSO- $d_6$ ,  $\delta$ ) : 0.96 (3H, d, J=6.7Hz), 1.08 (3H, d, J=5.7Hz), 1.5-1.7 (2H, m), 1.7-2.1 (7H, m), 2.1-2.4 (3H, m), 2.5-2.6 (1H, m), 3.1-3.2 (1H, m), 3.7-

3.8 (2H, m), 3.9-4.6 (15H, m), 4.7-4.9 (3H, m),  
5.0-5.1 (5H, m), 5.10 (1H, d, J=5.6Hz), 5.17 (1H,  
d, J=3.1Hz), 5.26 (1H, d, J=4.5Hz), 5.52 (1H, d,  
J=5.9Hz), 6.7-7.1 (9H, m), 7.2-7.5 (5H, m), 7.68  
5 (2H, d, J=8.2Hz), 7.72 (2H, d, J=6.7Hz), 7.96 (2H,  
d, J=8.2Hz), 8.06 (1H, d, J=8.4Hz), 8.28 (1H, d,  
J=7.7Hz), 8.76 (1H, d, J=7.0Hz), 8.85 (1H, s)

⌘ FAB-MASS :  $m/z = 1339.5$  ( $M+Na^+$ )

⌘ Elemental Analysis Calcd. for  $C_{59}H_{73}N_8O_{23}NaS \cdot 7H_2O$  :  
10 C 49.09, H 6.08, N 7.76  
Found : C 49.04, H 6.08, N 7.82

Example 52

⌘ IR (KBr) : 3350, 2954, 2937, 1670, 1631, 1440, 1257,  
15 1047  $cm^{-1}$

⌘ NMR (DMSO- $d_6$ ,  $\delta$ ) : 0.89 (3H, t, J=6.8Hz), 0.97 (3H, d,  
J=6.7Hz), 1.09 (2H, d, J=5.8Hz), 1.2-1.5 (6H, m),  
1.7-2.1 (5H, m), 2.1-2.4 (3H, m), 2.5-2.6 (1H, m),  
3.1-3.2 (1H, m), 3.7-4.6 (15H, m), 4.7-5.3 (11H,  
20 m), 5.5-5.6 (1H, m), 6.7-6.9 (1H, m), 7.0-7.5 (6H,  
m), 8.0-8.4 (8H, m), 8.85 (1H, s), 8.96 (1H, d,  
J=7.0Hz)

⌘ APCI-MASS :  $m/z = 1329.0$  ( $M+Na$ )<sup>+</sup>

⌘ Elemental Analysis Calcd. for  $C_{56}H_{71}N_{10}O_{23}NaS \cdot 6H_2O$  :  
25 C 47.52, H 5.91, N 9.90  
Found : C 47.42, H 6.05, N 9.90

Example 53

⌘ IR (KBr) : 3350, 2952, 1666, 1629, 1537, 1519,  
30 1255  $cm^{-1}$

⌘ NMR (DMSO- $d_6$ ,  $\delta$ ) : 0.89 (3H, t, J=6.7Hz), 0.96 (3H, d,  
J=6.4Hz), 1.08 (3H, d, J=5.6Hz), 1.7-2.4 (8H, m),  
2.5-2.6 (1H, m), 3.7-4.5 (15H, m), 4.7-5.1 (8H, m),  
5.11 (1H, d, J=5.5Hz), 5.17 (1H, d, J=3.1Hz), 5.26  
35 (1H, d, J=3.1Hz), 5.56 (1H, d, J=5.7Hz), 6.73 (1H,

d,  $J=8.2\text{Hz}$ ), 6.7-7.0 (2H, m), 7.05 (1H, s), 7.13 (2H, d,  $J=8.7\text{Hz}$ ), 7.2-7.5 (3H, m), 7.97 (2H, d,  $J=8.7\text{Hz}$ ), 8.1-8.4 (6H, m), 8.85 (1H, s), 8.92 (1H, d,  $J=7.0\text{Hz}$ )

5

$\rho$  FAB-MASS :  $m/z = 1345.3$  ( $M+\text{Na}$ )<sup>+</sup>  
 $\rho$  Elemental Analysis Calcd. for

$\text{C}_{56}\text{H}_{71}\text{N}_{10}\text{O}_{22}\text{S}_2\text{Na}\cdot 8\text{H}_2\text{O}$  :  
C 45.84, H 5.98, N 9.55

Found : C 45.87, H 6.07, N 9.55

10

CL

Example 54

$\rho$  IR (KBr pelet) : 3350, 2931, 1670, 1652, 1628, 1442, 1247, 1047  $\text{cm}^{-1}$

15

$\rho$  NMR ( $\text{DMSO}-d_6$ ,  $\delta$ ) : 0.86 (3H, t,  $J=6.6\text{Hz}$ ), 0.97 (3H, d,  $J=6.8\text{Hz}$ ), 1.12 (3H, d,  $J=6.8\text{Hz}$ ), 1.2-1.5 (10H, m), 1.7-2.0 (5H, m), 2.2-2.4 (3H, m), 2.5-2.6 (1H, m), 3.1-3.2 (1H, m), 3.72 (2H, br), 3.8-4.5 (17H, m), 4.7-5.2 (9H, m), 5.26 (1H, d,  $J=4.6\text{Hz}$ ), 5.57 (1H, d,  $J=5.7\text{Hz}$ ), 6.7-7.1 (7H, m), 7.3-7.5 (3H, m), 7.66 (2H, d,  $J=8.7\text{Hz}$ ), 8.10 (1H, d,  $J=7.6\text{Hz}$ ), 8.17 (1H, d,  $J=7.6\text{Hz}$ ), 8.76 (1H, d,  $J=7.0\text{Hz}$ ), 8.85 (1H, s)

20

$\rho$  FAB-MASS :  $m/z = 1293$  ( $M+\text{Na}^+$ )

$\rho$  Elemental Analysis Calcd. for  $\text{C}_{54}\text{H}_{75}\text{N}_{10}\text{O}_{22}\text{NaS}\cdot 7\text{H}_2\text{O}$  :

C 46.41, H 6.42, N 10.02

25

Found : C 46.51, H 6.43, N 9.95

CL

Example 55

$\rho$  IR (KBr) : 3345, 2937, 1650, 1511, 1249, 1047  $\text{cm}^{-1}$

30

$\rho$  NMR ( $\text{DMSO}-d_6$ ,  $\delta$ ) : 0.91 (3H, t,  $J=7.0\text{Hz}$ ), 0.96 (3H, t,  $J=7.8\text{Hz}$ ), 1.09 (3H, d,  $J=6.8\text{Hz}$ ), 1.3-1.5 (4H, m), 1.6-2.1 (5H, m), 2.1-2.5 (3H, m), 2.5-2.6 (1H, m), 3.1-3.3 (1H, m), 3.7-3.9 (2H, m), 3.9-4.6 (13H, m), 4.79 (2H, d,  $J=5.9\text{Hz}$ ), 4.8-4.9 (1H, m), 4.9-5.2 (5H, m), 5.10 (1H, d,  $J=5.9\text{Hz}$ ), 5.17 (1H, d,  $J=3.1\text{Hz}$ ), 5.25 (1H, d,  $J=4.6\text{Hz}$ ), 5.53 (1H, d,

35

Elemental Analysis Calcd. for  $C_{56}H_{71}N_{10}O_{22}SNa \cdot 8H_2O$  :

Found : C 46.93, H 5.87, N 9.74

IR (KBr) : 3350, 2958, 2935, 2873, 1666, 1629, 1247,  
1045  $\text{cm}^{-1}$

1 NMR (DMSO-d<sub>6</sub>, δ) : 0.9-1.1 (6H, m), 1.08 (3H, d, J=6.0Hz), 1.4-1.6 (2H, m), 1.6-2.1 (5H, m), 2.1-2.4 (3H, m), 2.5-2.6 (1H, m), 3.1-3.3 (1H, m), 3.6-4.5 (15H, m), 4.7-5.1 (8H, m), 5.10 (1H, d, J=5.5Hz), 5.17 (1H, d, J=2.9Hz), 5.25 (1H, d, J=4.5Hz), 5.55 (1H, d, J=5.7Hz), 6.7-6.9 (3H, m), 7.0-7.5 (8H, m), 7.68 (2H, d, J=8.9Hz), 7.73 (2H, d, J=8.3Hz), 8.01 (2H, d, J=8.3Hz), 8.10 (1H, d, J=8.4Hz), 8.26 (1H, d, J=7.7Hz), 8.8-9.0 (2H, m)

9 FAB-MASS :  $m/z = 1299.5$  (M+Na)<sup>+</sup>

Elemental Analysis Calcd. for  $C_{56}H_{69}N_8O_{23}NaS \cdot 6H_2O$  :

25 Found : C 48.52, H 5.94, N 8.07

IR (KBr) : 3355.5, 1662.3, 1629.6, 1267.0  $\text{cm}^{-1}$

30  $^1\text{H}$  NMR (DMSO- $d_6$ ,  $\delta$ ) : 0.88 (3H, t,  $J=6.8\text{Hz}$ ), 0.93 (3H, d,  $J=8.4\text{Hz}$ ), 0.97 (3H, d,  $J=6.7\text{Hz}$ ), 1.2-1.5 (4H, m), 1.5-1.95 (5H, m), 2.1-2.45 (4H, m), 2.5-2.7 (4H, m), 3.17 (1H, m), 3.55-4.45 (14H, m), 4.6-5.3 (13H, m), 5.56 (1H, d,  $J=5.6\text{Hz}$ ), 6.72 (1H, d,  $J=8.1\text{Hz}$ ), 6.75 (1H, s), 6.77 (1H, d,  $J=8.1\text{Hz}$ ), 7.04 (1H, s), 7.10 (1H, s), 7.2-7.45 (10H, m), 7.53 (4H, d,

J=6.6Hz), 7.85 (1H, d, J=7Hz), 7.92 (1H, d, J=7Hz),  
8.05 (1H, d, J=7Hz), 8.22 (1H, d, J=7Hz), 8.84 (1H,  
s)

⌈ FAB-MASS : m/z = 1408 (M+Na)

5

✓ Example 58

⌈ IR (KBr) : 3347.8, 1664.3, 1631.5, 1245.8 cm<sup>-1</sup>

⌈ NMR (DMSO-d<sub>6</sub>, δ) : 0.86 (3H, t, J=6.6Hz), 0.96 (3H, d,  
J=6.6Hz), 1.04 (3H, d, J=5.7Hz), 1.15-2.6 (21H,  
10 m), 3.16 (1H, m), 3.5-4.5 (16H, m), 4.6-5.4 (13H,  
m), 5.47 (1H, d, J=5.7Hz), 6.73 (1H, d, J=8.2Hz)  
6.78-6.85 (4H, m), 7.05 (1H, s), 7.10 (1H, s), 7.18  
(2H, d, J=8.6Hz), 7.25-7.45 (6H, m), 7.72 (1H, d,  
J=7Hz), 7.91 (1H, d, J=7Hz), 8.05 (1H, d, J=9.3Hz),  
15 8.20 (1H, d, J=7Hz), 8.85 (1H, s)

⌈ FAB-MASS : m/z = 1390 (M+Na)

⌈ Elemental Analysis Calcd. for C<sub>60</sub>H<sub>82</sub>N<sub>9</sub>O<sub>24</sub>SNa·5H<sub>2</sub>O :

C 49.41, H 6.36, N 8.64

Found : C 49.77, H 6.71, N 8.71

20

✓ Example 59

⌈ IR (KBr) : 3353.6, 1670.1, 1627.6, 1247.7 cm<sup>-1</sup>

⌈ NMR (DMSO-d<sub>6</sub>, δ) : 0.86 (3H, t, J=6.5Hz), 0.97 (3H, d,  
J=6.8Hz), 1.01 (3H, d, J=5.4Hz), 1.1-1.55 (12H, m),  
25 1.55-1.95 (5H, m), 2.05-4.7 (4H, m), 3.16 (1H, m),  
3.5-4.5 (16H, m), 4.6-5.3 (13H, m), 5.55 (1H, d,  
J=5.6Hz), 6.7-6.9 (5H, m), 7.05 (1H, s), 7.1 (1H,  
s), 7.15 (1H, d, J=8.5Hz), 7.25-7.5 (6H, m), 7.73  
(1H, d, J=8.4Hz), 7.92 (1H, d, J=7Hz), 8.08 (1H, d,  
30 J=8.4Hz), 8.18 (1H, d, J=7Hz), 8.84 (1H, s)

⌈ FAB-MASS : m/z = 1390 (M+Na)

✓ Example 60

⌈ NMR (DMSO-d<sub>6</sub>, δ) : 0.85 (3H, t, J=6.6Hz), 0.96 (3H, d,  
35 J=6.6Hz), 1.05 (3H, d, J=5.6Hz), 1.1-1.5 (22H, m),

1.5-2.5 (9H, m), 2.5-3.5 (4H, m), 3.5-4.45 (14H, m), 4.45-5.45 (12H, m), 6.72 (1H, d, J=8.2Hz), 6.79 (1H, s), 6.81 (1H, d, J=8.2Hz), 7.04 (1H, s), 7.05-7.5 (8H, m), 7.9-8.3 (3H, m), 8.84 (1H, s)

5  $\rho$  FAB-MASS : m/z = 1325 (M+Na)

$\rho$  Elemental Analysis Calcd. for  $C_{58}H_{89}N_8O_{22}SNa \cdot 6H_2O$  :

C 49.35, H 7.14, N 7.94

Found : C 49.33, H 7.04, N 7.87

10  $\rho$  Example 61

$\rho$  IR (KBr) : 3400, 1668.1, 1629.6, 1270.9  $cm^{-1}$

$\rho$  NMR (DMSO- $d_6$ ,  $\delta$ ) : 0.96 (3H, d, J=6.8Hz), 1.06 (3H, d, J=5.7Hz), 1.1-2.0 (33H, m), 2.1-2.5 (4H, m), 3.20 (3H, s), 3.28 (2H, t, J=6.5Hz), 3.1-3.3 (1H, m), 3.6-4.45 (14H, m), 4.6-5.3 (13H, m), 5.49 (1H, d, J=6.1Hz), 6.70 (1H, s), 6.72 (1H, d, J=8.2Hz), 6.80 (1H, d, J=8.2Hz), 7.03 (1H, s), 7.0-7.1 (1H, m), 7.15 (1H, s), 7.2-7.45 (6H, m), 8.0-8.3 (3H, m), 8.83 (1H, s)

15  $\rho$  FAB-MASS : m/z = 1426 (M+Na)

$\rho$  Elemental Analysis Calcd. for  $C_{62}H_{94}N_9O_{24}SNa \cdot 5H_2O$  :

C 49.82, H 7.01, N 8.43

Found : C 49.86, H 7.31, N 8.40

25  $\rho$  Example 62

$\rho$  IR (KBr) : 3355.5, 1668.1, 1629.6, 1274.7  $cm^{-1}$

$\rho$  NMR (DMSO- $d_6$ ,  $\delta$ ) : 0.85 (3H, t, J=6.5Hz), 0.96 (3H, d, J=6.7Hz), 1.04 (3H, d, J=5.9Hz), 1.1-2.6 (34H, m), 3.2 (1H, m), 3.6-4.55 (14H, m), 4.7-5.3 (11H, m), 5.47 (1H, d, J=5.9Hz), 6.72 (1H, d, J=8.1Hz), 6.79 (1H, s), 6.81 (1H, d, J=8.1Hz), 7.05 (1H, s), 7.11 (1H, s), 7.2-7.5 (2H, m), 8.0-8.15 (2H, m), 8.20 (1H, d, J=8.0Hz), 8.84 (1H, s)

$\rho$  FAB-MASS : m/z = 1235 (M+Na)

35  $\rho$  Elemental Analysis Calcd. for  $C_{51}H_{81}N_8O_{22}SNa \cdot 7H_2O$  :

C 45.73, H 7.15, N 8.37

Found : C 45.55, H 7.24, N 8.23

CL

Example 63

5 IR (KBr) : 3353.6, 1664.3, 1627.6  $\text{cm}^{-1}$

10 NMR (DMSO- $d_6$ ,  $\delta$ ) : 0.86 (3H, t,  $J=6.6\text{Hz}$ ), 0.95 (3H, d,  $J=6.7\text{Hz}$ ), 1.04 (3H, d,  $J=5.7\text{Hz}$ ), 1.2-2.7 (30H, m), 3.16 (1H, m), 3.6-4.5 (13H, m), 4.7-5.3 (11H, m), 5.51 (1H, d,  $J=6.0\text{Hz}$ ), 5.74 (1H, s), 6.72 (1H, d,  $J=8.2\text{Hz}$ ), 6.75 (1H, s), 6.77 (1H, d,  $J=8.2\text{Hz}$ ), 7.05 (1H, s), 7.2-7.5 (3H, m), 8.0-8.3 (3H, m), 8.85 (1H, s)

FAB-MASS :  $m/z$  = 1204 (M+Na)

15 Elemental Analysis Calcd. for  $\text{C}_{50}\text{H}_{77}\text{N}_8\text{O}_{21}\text{SNa}\cdot 5\text{H}_2\text{O}$  :

C 47.24, H 6.90, N 8.81

Found : C 46.98, H 7.12, N 8.72

CL

Example 64

Major product

20 IR (KBr) : 3400, 1675.8, 1631.5, 1511.9, 1234.2  $\text{cm}^{-1}$

25 NMR (DMSO- $d_6$ ,  $\delta$ ) : 0.96 (3H, d,  $J=6.6\text{Hz}$ ), 1.05 (3H, d,  $J=5.8\text{Hz}$ ), 1.2-1.6 (10H, m), 1.6-2.1 (5H, m), 2.1-2.7 (4H, m), 3.05-3.2 (4H, m), 3.20 (3H, s), 3.29 (2H, t,  $J=6.4\text{Hz}$ ), 3.3-3.5 (5H, m), 3.6-4.5 (15H, m), 4.7-5.3 (11H, m), 5.50 (1H, d,  $J=5.8\text{Hz}$ ), 6.73 (1H, d,  $J=8.2\text{Hz}$ ), 6.8-7.1 (9H, m), 7.2-7.5 (3H, m), 7.81 (2H, d,  $J=8.6\text{Hz}$ ), 8.08 (1H, d,  $J=8.2\text{Hz}$ ), 8.24 (1H, d,  $J=7\text{Hz}$ ), 8.44 (1H, d,  $J=7\text{Hz}$ ), 8.84 (1H, s)

FAB-MASS :  $m/z$  = 1403 (M+Na)

30 Elemental Analysis Calcd. for  $\text{C}_{61}\text{H}_{85}\text{N}_{10}\text{O}_{23}\text{SNa}\cdot 9\text{H}_2\text{O}$  :

C 47.47, H 6.73, N 9.07

Found : C 47.43, H 7.06, N 9.03

Minor product

35 IR (KBr) : 3350, 1668.1, 1631.5, 1511.9, 1234.2  $\text{cm}^{-1}$



- 5  $\rho$  NMR (DMSO- $d_6$ ,  $\delta$ ) : 0.96 (3H, d,  $J=6.6\text{Hz}$ ), 1.07 (3H, d,  $J=5.8\text{Hz}$ ), 1.2-1.5 (6H, m), 1.55-2.1 (7H, m), 2.1-2.65 (4H, m), 3.0-3.6 (9H, m), 3.7-4.5 (15H, m), 4.7-5.6 (14H, m), 5.7-6.0 (1H, m), 6.72 (1H, d,  $J=8.0\text{Hz}$ ), 6.75-7.1 (9H, m), 7.25-7.5 (3H, m), 7.81 (2H, d,  $J=8.3\text{Hz}$ ), 8.08 (1H, d,  $J=8.2\text{Hz}$ ), 8.25 (1H, d,  $J=7\text{Hz}$ ), 8.45 (1H, d,  $J=7\text{Hz}$ ), 8.85 (1H, s)
- $\rho$  FAB-MASS :  $m/z = 1371$  (M+Na)
- 10  $\rho$  Elemental Analysis Calcd. for  $\text{C}_{60}\text{H}_{81}\text{N}_{10}\text{O}_{22}\text{SNa}\cdot 8\text{H}_2\text{O}$  :  
C 48.25, H 6.55, N 9.38  
Found : C 48.10, H 6.81, N 9.40

$\checkmark$  Example 65

- 15  $\rho$  IR (KBr) : 3450, 1668.1, 1635.3  $\text{cm}^{-1}$
- $\rho$  NMR (DMSO- $d_6$ ,  $\delta$ ) : 0.88 (3H, t,  $J=6.5\text{Hz}$ ), 0.96 (3H, d,  $J=6.7\text{Hz}$ ), 1.06 (3H, d,  $J=6\text{Hz}$ ), 1.2-1.5 (6H, m), 1.6-2.1 (5H, m), 2.1-2.7 (4H, m), 3.1-3.4 (9H, m), 3.6-4.5 (15H, m), 4.7-5.3 (11H, m), 5.49 (1H, d,  $J=5.8\text{Hz}$ ), 6.73 (1H, d,  $J=8.2\text{Hz}$ ), 6.8-7.0 (2H, m), 6.83 (2H, d,  $J=9.0\text{Hz}$ ), 6.94 (2H, d,  $J=9.0\text{Hz}$ ), 7.04 (1H, s), 7.12 (1H, t,  $J=8.4\text{Hz}$ ), 7.2-7.5 (3H, m), 7.65-7.8 (2H, m), 8.09 (1H, d,  $J=8.4\text{Hz}$ ), 8.25 (1H, d,  $J=7\text{Hz}$ ), 8.63 (1H, d,  $J=7\text{Hz}$ ), 8.84 (1H, s)
- 20
- $\rho$  FAB-MASS :  $m/z = 1363$  (M+Na)
- 25  $\rho$  Elemental Analysis Calcd. for  $\text{C}_{58}\text{H}_{78}\text{FN}_{10}\text{O}_{22}\text{SNa}\cdot 5\text{H}_2\text{O}$  :  
C 48.67, H 6.20, N 9.79  
Found : C 48.83, H 6.15, N 9.74

$\checkmark$  Example 66

- 30  $\rho$  IR (KBr) : 3400, 1668.1, 1635.3, 1510.0, 1240.0  $\text{cm}^{-1}$
- $\rho$  NMR (DMSO- $d_6$ ,  $\delta$ ) : 0.88 (3H, t,  $J=6.6\text{Hz}$ ), 1.2-1.5 (6H, m), 1.5-2.05 (5H, m), 2.1-2.65 (4H, m), 3.1-3.3 (9H, m), 3.6-4.5 (15H, m), 4.7-5.3 (11H, m), 5.51 (1H, d,  $J=5.8\text{Hz}$ ), 6.73 (1H, d,  $J=8.2\text{Hz}$ ), 6.8-6.9 (4H, m), 6.94 (2H, d,  $J=9.2\text{Hz}$ ), 7.04 (1H, s), 7.24
- 35

(1H, d, J=8.5Hz), 7.15-7.5 (3H, m), 7.86 (1H, dd, J=8.6 and 2.1Hz), 8.02 (1H, d, J=2.1Hz), 8.04 (1H, d, J=8.4Hz), 8.23 (1H, d, J=7Hz), 8.70 (1H, d, J=7Hz), 8.84 (1H, s)

5  $\rho$  FAB-MASS :  $m/z$  = 1379 (M+Na)

$\rho$  Elemental Analysis Calcd. for  $C_{53}H_{78}ClN_{10}O_{22}SNa \cdot 6H_2O$  :

C 47.52, H 6.19, N 9.55

Found : C 47.78, H 6.23, N 9.55

10  $\rho$  Example 67

$\rho$  IR (KBr) : 3400, 1670  $cm^{-1}$

$\rho$  NMR (DMSO- $d_6$ ,  $\delta$ ) : 0.96 (3H, d, J=6.7Hz), 1.05 (3H, d, J=5.7Hz), 1.4-2.65 (17H, m), 2.65-3.6 (8H, m), 3.6-4.5 (15H, m), 4.6-5.3 (11H, m), 5.44 (1H, d, J=6.0Hz), 6.73 (1H, d, J=8.2Hz), 6.81 (1H, s), 6.83 (1H, d, J=8.2Hz), 6.98 (2H, d, J=8.9Hz), 7.05 (1H, s), 7.2-7.5 (3H, m), 7.80 (2H, d, J=8.9Hz), 8.05 (1H, d, J=8.4Hz), 8.26 (1H, d, J=7Hz), 8.39 (1H, d, J=7Hz), 8.84 (1H, s)

20  $\rho$  FAB-MASS :  $m/z$  = 1229 (M+Na)

$\rho$  Elemental Analysis Calcd. for  $C_{52}H_{74}N_{10}O_{21}S \cdot 5H_2O$  :

C 48.14, H 6.53, N 10.80

Found : C 48.29, H 6.33, N 10.95

25  $\rho$  Example 68

$\rho$  IR (KBr) : 3400, 1652.7, 1635.3, 1511.9, 1241.9  $cm^{-1}$

$\rho$  NMR (DMSO- $d_6$ ,  $\delta$ ) : 0.88 (3H, t, J=6.6Hz), 0.97 (3H, d, J=6.7Hz), 1.09 (3H, d, J=5.7Hz), 1.2-1.5 (6H, m), 1.6-2.0 (5H, m), 2.1-2.6 (4H, m), 3.0-3.3 (5H, m), 3.6-4.6 (19H, m), 4.7-5.3 (11H, m), 5.53 (1H, d, J=5.6Hz), 6.73 (1H, d, J=8.2Hz), 6.75-7.0 (2H, m), 6.83 (2H, d, J=9.2Hz), 6.95 (2H, d, J=9.2Hz), 7.05 (1H, s), 7.12 (1H, s), 7.25-7.5 (2H, m), 7.42 (1H, d, J=9.5Hz), 7.84 (1H, d, J=9.5Hz), 7.9-8.1 (2H, m), 8.71 (1H, d, J=7Hz), 8.84 (1H, s)

f FAB-MASS :  $m/z = 1347$  (M+Na)

f Elemental Analysis Calcd. for  $C_{56}H_{77}N_{12}O_{22}SNa \cdot 7H_2O$  :  
C 46.34, H 6.32, N 11.58  
Found : C 46.38, H 6.18, N 11.36

5

CL Example 69

f NMR (DMSO- $d_6$ ,  $\delta$ ) : 0.88 (3H, t,  $J=6.6$ Hz), 0.97 (3H, d,  $J=6.7$ Hz), 1.08 (3H, d,  $J=5.8$ Hz), 1.2-1.5 (6H, m), 1.6-2.05 (5H, m), 2.1-2.6 (4H, m), 3.0-3.3 (5H, m), 3.4-3.55 (4H, m), 3.7-4.6 (15H, m), 4.7-5.3 (11H, m), 5.52 (1H, d,  $J=5.8$ Hz), 6.73 (1H, d,  $J=8.1$ Hz), 6.8-6.95 (2H, m), 6.83 (2H, d,  $J=9.3$ Hz), 6.95 (2H, d,  $J=9.3$ Hz) 7.05 (1H, s), 7.14 (1H, s), 7.3-7.6 (3H, m), 7.84 (1H, d,  $J=8.6$ Hz), 7.95-8.1 (2H, m), 8.40 (1H, s), 8.42 (1H, d,  $J=7$ Hz), 8.84 (1H, s)

15

f FAB-MASS :  $m/z = 1346$  (M+Na)

f Elemental Analysis Calcd. for  $C_{57}H_{78}N_{11}O_{22}SNa \cdot 5H_2O$  :  
C 48.40, H 6.27, N 10.89  
Found : C 48.32, H 6.44, N 10.86

20

CL Example 70

f IR (KBr) : 3400, 1668.1, 1629.6, 1511.9  $cm^{-1}$

f NMR (DMSO- $d_6$ ,  $\delta$ ) : 0.96 (3H, d,  $J=6.7$ Hz), 1.06 (3H, d,  $J=5.7$ Hz), 1.15-1.5 (6H, m), 1.6-2.0 (7H, m), 2.1-2.65 (5H, m), 3.1-3.5 (9H, m), 3.6-4.5 (13H, m), 4.7-5.3 (11H, m), 5.46 (1H, d,  $J=5.9$ Hz), 6.73 (1H, d,  $J=8.2$ Hz), 6.81 (1H, s), 6.84 (1H, d,  $J=8.2$ Hz), 6.91 (2H, d,  $J=8.7$ Hz), 6.95-7.05 (3H, m), 7.09 (2H, d,  $J=8.7$ Hz), 7.25-7.5 (3H, m), 7.81 (2H, d,  $J=8.8$ Hz), 8.09 (1H, d,  $J=7$ Hz), 8.25 (1H, d,  $J=7$ Hz), 8.04 (1H, d,  $J=7$ Hz), 8.84 (1H, s)

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f FAB-MASS :  $m/z = 1327$  (M+Na)

f Elemental Analysis Calcd. for  $C_{58}H_{77}N_{10}O_{21}SNa \cdot 5H_2O$  :  
C 49.92, H 6.28, N 10.03  
Found : C 49.75, H 6.41, N 10.25

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CL Example 71

IR (KBr) : 3350, 1668.1, 1629.6, 1511.9, 1232.3  $\text{cm}^{-1}$   
NMR (DMSO- $d_6$ ,  $\delta$ ) : 0.85 (3H, t,  $J=6.5\text{Hz}$ ), 0.96 (3H, d,  $J=6.7\text{Hz}$ ), 1.06 (3H, d,  $J=6.0\text{Hz}$ ), 1.2-1.4 (6H, m), 1.4-1.6 (2H, m), 1.7-2.1 (3H, m), 2.1-2.7 (6H, m), 3.1-3.5 (9H, m), 3.72 (2H, m), 3.8-4.5 (11H, m), 4.7-5.3 (11H, m), 5.47 (1H, d,  $J=5.9\text{Hz}$ ), 6.73 (1H, d,  $J=8.2\text{Hz}$ ), 6.8-6.9 (2H, m), 6.91 (2H, d,  $J=8.6\text{Hz}$ ), 6.95-7.15 (5H, m), 7.25-7.5 (3H, m), 7.81 (2H, d,  $J=8.8\text{Hz}$ ), 8.09 (1H, d,  $J=8.4\text{Hz}$ ), 8.26 (1H, d,  $J=7\text{Hz}$ ), 8.40 (1H, d,  $J=7\text{Hz}$ ), 8.84 (1H, s)  
FAB-MASS :  $m/z$  = 1329 (M+Na)  
Elemental Analysis Calcd. for  $\text{C}_{55}\text{H}_{79}\text{N}_{10}\text{NaO}_{21}\text{S}\cdot 6\text{H}_2\text{O}$  :  
C 49.22, H 6.48, N 9.90  
Found : C 49.33, H 6.67, N 9.89

CL Example 72

IR (KBr) : 3450, 1668.1, 1631.5, 1240.0  $\text{cm}^{-1}$   
NMR (DMSO- $d_6$ ,  $\delta$ ) : 0.96 (3H, d,  $J=6.6\text{Hz}$ ), 1.05 (3H, d,  $J=5.6\text{Hz}$ ), 1.3-1.7 (4H, m), 1.7-2.1 (7H, m), 2.1-2.73 (6H, m), 2.75-3.05 (4H, m), 3.05-4.5 (18H, m), 4.7-5.5 (12H, m), 6.72 (1H, d,  $J=8.3\text{Hz}$ ), 6.77-6.9 (2H, m), 6.96 (2H, d,  $J=8.6\text{Hz}$ ), 7.05 (1H, s), 7.1-7.5 (8H, m), 7.80 (2H, d,  $J=8.6\text{Hz}$ ), 8.06 (1H, d,  $J=8.4\text{Hz}$ ), 8.28 (1H, d,  $J=7\text{Hz}$ ), 8.41 (1H, d,  $J=7\text{Hz}$ ), 8.84 (1H, s)  
FAB-MASS :  $m/z$  = 1305 (M+Na)  
Elemental Analysis Calcd. for  $\text{C}_{58}\text{H}_{78}\text{N}_{10}\text{O}_{21}\text{S}\cdot 8\text{H}_2\text{O}$  :  
C 48.80, H 6.64, N 9.81  
Found : C 48.88, H 6.50, N 9.81

CL Example 73

IR (KBr) : 1673.9, 1646.9, 1510.0, 1238.1  $\text{cm}^{-1}$   
NMR (DMSO- $d_6$ ,  $\delta$ ) : 0.87 (3H, t,  $J=6.4\text{Hz}$ ), 0.96 (3H, d,  $J=6.6\text{Hz}$ ), 1.05 (3H, d,  $J=5.6\text{Hz}$ ), 1.2-1.5 (6H, m),

1.5-2.0 (9H, m), 2.1-2.8 (11H, m), 3.1-3.4 (5H, m),  
3.4-4.5 (17H, m), 4.6-5.5 (12H, m), 6.6-7.0 (9H,  
m), 7.04 (1H, s), 7.2-7.5 (3H, m), 7.78 (2H, d,  
J=8.7Hz), 8.05 (1H, d, J=8.4Hz), 8.24 (1H, d,  
J=7Hz), 8.39 (1H, d, J=7Hz), 8.84 (1H, s)

FAB-MASS :  $m/z = 1326$  ( $M^+ - SO_3 + Na$ )

Elemental Analysis Calcd. for  $C_{63}H_{89}N_{11}O_{22}S \cdot 9H_2O$  :

C 48.92, H 6.97, N 9.96

Found : C 48.77, H 6.73, N 9.94

#### Example 74

IR (KBr) : 3450, 1670.1, 1631.5, 1280.5  $cm^{-1}$

NMR (DMSO- $d_6$ ,  $\delta$ ) : 0.87 (3H, t, J=7.0Hz), 0.96 (3H, t,  
J=6.8Hz), 1.05 (3H, d, J=5.6Hz), 1.1-1.65 (13H, m),  
1.65-2.1 (7H, m), 2.1-2.65 (5H, m), 3.17 (1H, m),  
3.6-4.5 (13H, m), 4.7-5.3 (11H, m), 5.49 (1H, d,  
J=5.9Hz), 6.72 (1H, d, J=8.2Hz), 6.82 (1H, d,  
J=8.2Hz), 6.84 (1H, s), 7.04 (1H, s), 7.29 (2H, d,  
J=8.3Hz), 7.2-7.5 (3H, m), 7.80 (2H, d, J=8.3Hz),  
8.10 (1H, d, J=8.4Hz), 8.26 (1H, d, J=7Hz), 8.65  
(1H, d, J=7Hz), 8.84 (1H, s)

FAB-MASS :  $m/z = 1237$  (M+Na)

Elemental Analysis Calcd. for  $C_{53}H_{75}N_8O_{21}SNa \cdot 6H_2O$  :

C 48.10, H 6.63, N 8.47

Found : C 48.26, H 6.62, N 8.46

#### Example 75

IR (KBr) : 3400, 1670.1, 1627.6, 1272.8  $cm^{-1}$

NMR (DMSO- $d_6$ ,  $\delta$ ) : 0.96 (3H, d, J=3.3Hz), 1.08 (3H, d,  
J=5.7Hz), 1.2-1.6 (10H, m), 1.6-2.1 (5H, m), 2.1-  
2.7 (4H, m), 3.0-3.3 (1H, m), 3.20 (3H, s), 3.29  
(2H, t, J=6.4Hz), 3.73 (2H, m), 3.9-4.6 (13H, m),  
4.7-5.3 (11H, m), 5.53 (1H, d, J=5.8Hz), 6.73 (1H,  
d, J=8.3Hz), 6.83 (1H, d, J=8.3Hz), 6.91 (1H, s),  
7.05 (1H, s), 7.23 (1H, dd, J=9.0 and 2.3Hz), 7.3-

7.5 (4H, m), 7.8-8.0 (3H, m), 8.09 (1H, d, J=8.4Hz), 8.33 (1H, d, J=7Hz), 8.44 (1H, s), 8.80 (1H, d, J=7Hz), 8.85 (1H, s)

FAB-MASS :  $m/z = 1293$  (M+Na)

5 Elemental Analysis Calcd. for  $C_{55}H_{75}N_8O_{23}SNa \cdot 6H_2O$  :

C 47.89, H 6.36, N 8.12

Found : C 47.81, H 6.26, N 8.05

CL Example 76

10 IR (KBr) : 3361.3, 1668.1, 1635.3, 1627.6  $cm^{-1}$

15 NMR (DMSO- $d_6$ ,  $\delta$ ) : 0.86 (3H, t, J=6.7Hz), 0.96 (3H, d, J=6.7Hz), 1.09 (3H, d, J=5.8Hz), 1.19-1.25 (8H, m), 1.25-2.00 (5H, m), 2.02-2.53 (4H, m), 2.44 (3H, s), 2.61 (2H, t, J=7.6Hz), 3.05-3.27 (1H, m), 3.55-4.50 (13H, m), 4.65-5.65 (12H, m), 6.42 (1H, s), 6.65-6.95 (3H, m), 7.05 (1H, d, J=0.4Hz), 7.13-7.50 (5H, m), 7.50-7.88 (6H, m), 8.10 (1H, d, J=9.0Hz), 8.25 (1H, d, J=8.4Hz), 8.40 (1H, d, J=7.0Hz), 8.85 (1H, s)

20 FAB-MASS :  $m/z = 1299.3$  (M+Na-1)

Elemental Analysis Calcd. for  $C_{58}H_{77}N_8NaO_{21}S \cdot 5H_2O$  :

C 50.94, H 6.41, N 8.19

Found : C 50.99, H 6.40, N 8.15

25 CL Example 77

IR (Nujol) : 3351.7, 1670.1, 1652.7, 1623.8  $cm^{-1}$

30 NMR (DMSO- $d_6$ ,  $\delta$ ) : 0.86 (3H, t, J=6.7Hz), 0.96 (3H, d, J=6.7Hz), 1.06 (3H, d, J=5.8Hz), 1.13-1.45 (8H, m), 1.47-1.96 (5H, m), 2.06-2.66 (8H, m), 2.81 (2H, t, J=7.6Hz), 3.04-3.30 (1H, m), 3.53-4.50 (13H, m), 4.53-5.70 (12H, m), 6.64-6.88 (3H, m), 7.04 (1H, d, J=0.4Hz), 7.13-7.60 (11H, m), 8.10 (1H, d, J=9.0Hz), 8.18 (1H, d, J=8.4Hz), 8.30 (1H, d, J=7.0Hz), 8.85 (1H, s)

35 FAB-MASS :  $m/z = 1287.4$  (M+Na-1)

Elemental Analysis Calcd. for  $C_{57}H_{77}N_8NaO_{21}S \cdot 5H_2O$  :  
C 50.51, H 6.46, N 8.27  
Found : C 50.84, H 6.60, N 8.33

5 Example 73

IR (KBr) : 3361.3, 1683.6, 1670.1, 1662.3, 1652.7,  
1646.9, 1635.3, 1627.6, 1623.8  $cm^{-1}$

10 NMR (DMSO- $d_6$ ,  $\delta$ ) : 0.97 (3H, d,  $J=6.7Hz$ ), 1.07 (3H, d,  
 $J=5.6Hz$ ), 1.28-2.00 (13H, m), 2.08-2.60 (4H, m),  
3.07-3.30 (1H, m), 3.60-4.66 (17H, m), 4.66-5.12  
(9H, m), 5.11 (1H, d,  $J=3.1Hz$ ), 5.25 (1H, d,  
 $J=4.6Hz$ ), 5.52 (1H, d,  $J=6.0Hz$ ), 6.62-6.95 (4H, m),  
6.95-7.15 (3H, m), 7.20-7.50 (3H, m), 7.50-7.85  
15 (7H, m), 8.12 (1H, d,  $J=8.4Hz$ ), 8.35 (1H, d,  
 $J=7.7Hz$ ), 8.53 (1H, d,  $J=7.0Hz$ ), 8.85 (1H, s)

FAB-MASS :  $m/z = 1319.7$  ( $M+Na-1$ )

Elemental Analysis Calcd. for  $C_{57}H_{74}N_8NaO_{22}SF \cdot 8H_2O$  :  
C 47.49, H 6.29, N 7.77  
Found : C 47.79, H 6.16, N 7.93

20 Example 79

IR (KBr) : 3354.9, 1668.1, 1662.3, 1654.6, 1646.9,  
1627.6  $cm^{-1}$

25 NMR (DMSO- $d_6$ ,  $\delta$ ) : 0.85 (3H, t,  $J=6.7Hz$ ), 0.90-1.10  
(6H, m), 1.10-1.40 (8H, m), 1.48-1.95 (5H, m),  
2.05-2.46 (4H, m), 2.60 (2H, t,  $J=7.6Hz$ ), 3.07-3.23  
(1H, m), 3.55-4.45 (14H, m), 4.67-5.32 (11H, m),  
5.48-5.63 (1H, m), 6.22 (1H, ,  $J=5.3Hz$ ), 6.65-6.89  
(3H, m), 6.97-7.15 (2H, m), 7.20-7.68 (10H, m),  
30 7.85-8.20 (3H, m), 8.84 (1H, s)

FAB-MASS :  $m/z = 1289.4$  ( $M+Na-1$ )

Elemental Analysis Calcd. for  $C_{56}H_{75}N_8NaO_{22}S \cdot 3H_2O$  :  
C 50.90, H 6.18, N 8.48  
Found : C 50.80, H 6.44, N 8.29

CL Example 80

IR (KBr) : 3361.3, 1664.3, 1631.5, 1600.6  $\text{cm}^{-1}$

5 NMR (DMSO- $\text{d}_6$ ,  $\delta$ ) : 0.86 (3H, t,  $J=6.7\text{Hz}$ ), 0.98 (3H, d,  $J=6.7\text{Hz}$ ), 1.16 (3H, t,  $J=5.9\text{Hz}$ ), 1.20-1.45 (8H, m), 1.50-1.70 (2H, m), 1.70-2.05 (3H, m), 2.10-2.57 (4H, m), 2.63 (2H, t,  $J=7.6\text{Hz}$ ), 3.10-3.30 (1H, m), 3.68-4.50 (13H, m), 4.78-5.32 (11H, m), 5.66 (1H, d,  $J=5.7\text{Hz}$ ), 6.68-7.02 (3H, m), 7.04 (1H, d,  $J=0.4\text{Hz}$ ), 7.25-7.48 (4H, m), 7.60-8.08 (7H, m), 8.10 (1H, d,  $J=8.4\text{Hz}$ ), 8.28 (1H, d,  $J=7.7\text{Hz}$ ), 8.85 (1H, s), 9.30 (1H, d,  $J=7.1\text{Hz}$ )

10 FAB-MASS :  $m/z = 1287.5$  ( $M+\text{Na}-1$ )

Elemental Analysis Calcd. for  $\text{C}_{55}\text{H}_{73}\text{N}_8\text{NaO}_{22}\text{S}\cdot 3\text{H}_2\text{O}$  :

C 50.53, H 6.09, N 8.57

15 Found : C 50.66, H 6.01, N 8.22

CL Example 81

IR (KBr) : 3349.7, 1668.1, 1627.6  $\text{cm}^{-1}$

20 NMR (DMSO- $\text{d}_6$ ,  $\delta$ ) : 0.85 (3H, t,  $J=6.7\text{Hz}$ ), 0.96 (3H, d,  $J=6.7\text{Hz}$ ), 1.09 (3H, d,  $J=5.8\text{Hz}$ ), 1.18-1.48 (8H, m), 1.50-2.10 (5H, m), 2.10-2.45 (3H, m), 2.50-2.65 (1H, m), 2.77 (2H, t,  $J=7.6\text{Hz}$ ), 3.05-3.25 (1H, m), 3.60-4.65 (13H, m), 4.67-5.60 (12H, m), 6.65-6.97 (3H, m), 7.05 (1H, d,  $J=0.4\text{Hz}$ ), 7.21-7.43 (4H, m), 7.76 (1H, s), 7.83-8.05 (3H, m), 8.10 (1H, d,  $J=9.0\text{Hz}$ ), 8.29 (1H, d,  $J=8.4\text{Hz}$ ), 8.48 (1H, s), 8.64-9.03 (2H, m)

25 FAB-MASS :  $m/z = 1233.0$  ( $M+\text{Na}-1$ )

30 Elemental Analysis Calcd. for  $\text{C}_{53}\text{H}_{71}\text{N}_8\text{NaO}_{20}\text{S}\cdot 3\text{H}_2\text{O}$  :

C 50.96, H 6.22, N 8.96

Found : C 50.62, H 6.40, N 8.92

CL Example 82

IR (KBr) : 3361.3, 1670.1, 1627.6  $\text{cm}^{-1}$

35 NMR (DMSO- $\text{d}_6$ ,  $\delta$ ) : 0.88 (3H, t,  $J=6.7\text{Hz}$ ), 0.96 (3H, d,



5 J=6.7Hz), 1.09 (3H, d, J=5.9Hz), 1.18-1.43 (6H, m),  
1.50-2.10 (5H, m), 2.10-2.69 (4H, m), 2.77 (2H, t,  
J=7.6Hz), 3.07-3.29 (1H, m), 3.60-4.62 (13H, m),  
4.69-5.23 (10H, m), 5.27 (1H, d, J=4.5Hz), 5.55  
(1H, d, J=5.9Hz), 6.68-7.00 (3H, m), 7.05 (1H, d,  
J=0.4Hz), 7.25-7.53 (4H, m), 7.76 (1H, s), 7.84-  
8.05 (3H, m), 8.13 (1H, d, J=8.4Hz), 8.33 (1H, d,  
J=7.7Hz), 8.48 (1H, s), 8.73-9.00 (2H, m)

10 FAB-MASS : m/z = 1219.4 (M+Na-1)  
Elemental Analysis Calcd. for  $C_{52}H_{69}N_8NaO_{21}S \cdot 5H_2O$  :  
C 48.51, H 6.19, N 8.71  
Found : C 48.67, H 6.34, N 8.74

CL Example 83

15 IR (KBr) : 3357.5, 1668.1, 1627.6  $cm^{-1}$   
NMR (DMSO- $d_6$ ,  $\delta$ ) : 0.97 (3H, d, J=6.7Hz), 1.07 (3H, d,  
J=6.0Hz), 1.20-1.62 (10H, m), 1.62-2.00 (5H, m),  
2.10-2.65 (4H, m), 3.20 (3H, s), 3.08-3.45 (1H, m),  
3.28 (2H, t, J=6.5Hz), 3.53-4.50 (15H, m), 4.68-  
20 5.13 (9H, m), 5.17 (1H, d, J=3.1Hz), 5.25 (1H, d,  
J=4.4Hz), 5.53 (1H, d, J=6.0Hz), 6.68-6.95 (4H, m),  
6.95-7.11 (3H, m), 7.20-7.52 (3H, m), 7.55-7.95  
(7H, m), 8.13 (1H, d, J=8.4Hz), 8.30 (1H, d,  
J=7.7Hz), 8.52 (1H, d, J=7.0Hz), 8.85 (1H, s)

25 FAB-MASS : m/z = 1345.2 (M+Na-1)  
Elemental Analysis Calcd. for  $C_{59}H_{79}N_8NaO_{23}S \cdot 8H_2O$  :  
C 48.29, H 6.53, N 7.64  
Found : C 48.44, H 6.58, N 7.75

30 CL Example 84

IR (KBr) : 3353.6, 1662.3, 1627.6  $cm^{-1}$   
NMR (DMSO- $d_6$ ,  $\delta$ ) : 0.96 (3H, d, J=6.7Hz), 1.07 (3H, d,  
J=5.5Hz), 1.40-1.65 (2H, m), 1.65-2.00 (5H, m),  
2.00-2.67 (6H, m), 3.08-3.30 (1H, m), 3.50-4.50  
35 (15H, m), 4.68-5.13 (11H, m), 5.18 (1H, d,

J=3.1Hz), 5.26 (1H, d, J=4.5Hz), 5.53 (1H, d, J=6.0Hz), 5.70-6.00 (1H, m), 6.63-6.95 (4H, m), 6.95-7.13 (3H, m), 7.20-7.52 (3H, m), 7.52-7.95 (7H, m), 8.12 (1H, d, J=8.4Hz), 8.31 (1H, d, J=7.7Hz), 8.53 (1H, d, J=7.0Hz), 8.85 (1H, s)

P FAB-MASS :  $m/z = 1285.4$  (M+Na-1)

P Elemental Analysis Calcd. for  $C_{56}H_{71}N_8O_{22}SNa \cdot 8H_2O$  :

C 47.79, H 6.23, N 7.96

Found : C 47.59, H 6.32, N 8.06

10

CL

Example 85

P IR (KBr) : 3363.2, 1670.1, 1627.6  $cm^{-1}$

P NMR (DMSO- $d_6$ ,  $\delta$ ) : 0.89 (6H, d, J=6.5Hz), 0.96 (3H, d, J=6.7Hz), 1.07 (3H, d, J=5.7Hz), 1.22-1.41 (2H, m), 1.50-1.97 (6H, m), 2.11-2.65 (4H, m), 3.10-3.30 (1H, m), 3.60-4.50 (15H, m), 4.70-5.08 (8H, m), 5.10 (1H, d, J=5.6Hz), 5.16 (1H, d, J=3.1Hz), 5.25 (1H, d, J=4.5Hz), 5.50 (1H, d, J=5.9Hz), 6.65-6.92 (4H, m), 6.92-7.12 (3H, m), 7.21-7.50 (3H, m), 7.52-7.90 (7H, m), 8.12 (1H, d, J=8.4Hz), 8.30 (1H, d, J=7.7Hz), 8.56 (1H, d, J=7.0Hz), 8.85 (1H, s)

15

20

P FAB-MASS :  $m/z = 1287.6$  (M+Na-1)

P Elemental Analysis Calcd. for  $C_{56}H_{73}N_8NaO_{22}S \cdot 6.5H_2O$  :

C 48.66, H 6.27, N 8.11

Found : C 48.67, H 6.32, N 8.20

25

CL Example 86

P IR (KBr) : 3361.3, 1683.6, 1670.1, 1654.6, 1635.3, 1623.8  $cm^{-1}$

30

P NMR (DMSO- $d_6$ ,  $\delta$ ) : 0.97 (3H, d, J=6.7Hz), 1.07 (3H, d, J=5.6Hz), 1.30-2.00 (11H, m), 2.10-2.70 (4H, m), 3.05-3.15 (1H, m), 3.55-4.70 (17H, m), 4.70-5.11 (9H, m), 5.16 (1H, d, J=3.1Hz), 5.25 (1H, d, J=4.5Hz), 5.52 (1H, d, J=6.0Hz), 6.65-6.95 (4H, m), 6.95-7.10 (3H, m), 7.10-7.50 (3H, m), 7.50-7.85

35

(7H, m), 8.12 (1H, d,  $J=8.4\text{Hz}$ ), 8.30 (1H, d,  $J=8.3\text{Hz}$ ), 8.52 (1H, d,  $J=7.0\text{Hz}$ ), 8.85 (1H, s)

$\rho$  FAB-MASS :  $m/z = 1305.2$  ( $M+\text{Na}-1$ )

$\rho$  Elemental Analysis Calcd. for  $\text{C}_{56}\text{H}_{72}\text{N}_8\text{NaO}_{22}\text{SF}\cdot 6\text{H}_2\text{O}$  :

C 48.34, H 6.09, N 8.05

Found : C 48.47, H 6.29, N 7.95

5

CL

Example 87

$\rho$  IR (KBr) : 3359.4, 1668.1, 1654.6, 1625.7  $\text{cm}^{-1}$

10

$\rho$  NMR ( $\text{DMSO}-d_6$ ,  $\delta$ ) : 0.97 (3H, d,  $J=6.7\text{Hz}$ ), 1.07 (3H, d,  $J=6.0\text{Hz}$ ), 1.22-1.62 (6H, m), 1.62-2.00 (5H, m), 2.10-2.65 (4H, m), 3.20 (3H, s), 3.05-3.40 (1H, m), 3.31 (2H, t,  $J=6.5\text{Hz}$ ), 3.60-4.55 (15H, m), 4.65-5.13 (9H, m), 5.16 (1H, d,  $J=3.1\text{Hz}$ ), 5.26 (1H, d,  $J=4.4\text{Hz}$ ), 5.53 (1H, d,  $J=6.0\text{Hz}$ ), 6.68-6.95 (4H, m), 6.95-7.20 (3H, m), 7.20-7.58 (3H, m), 7.58-7.90 (7H, m), 8.13 (1H, d,  $J=8.4\text{Hz}$ ), 8.32 (1H, d,  $J=7.7\text{Hz}$ ), 8.53 (1H, d,  $J=7.0\text{Hz}$ ), 8.85 (1H, s)

15

$\rho$  FAB-MASS :  $m/z = 1317.6$  ( $M+\text{Na}-1$ )

20

$\rho$  Elemental Analysis Calcd. for  $\text{C}_{57}\text{H}_{75}\text{N}_8\text{NaO}_{23}\text{S}\cdot 7\text{H}_2\text{O}$  :

C 48.16, H 6.31, N 7.88

Found : C 48.21, H 6.60, N 7.78

CL

Example 88

25

$\rho$  IR (KBr) : 3350, 2954, 1668, 1629, 1538, 1511, 1454, 1249  $\text{cm}^{-1}$

$\rho$  NMR ( $\text{DMSO}-d_6$ ,  $\delta$ ) : 0.88 (3H, t,  $J=7.1\text{Hz}$ ), 0.96 (3H, d,  $J=7.5\text{Hz}$ ), 1.08 (2H, d,  $J=5.7\text{Hz}$ ), 1.2-1.5 (6H, m), 1.6-2.4 (8H, m), 2.6-2.7 (1H, m), 3.1-3.3 (1H, m), 3.6-4.5 (19H, m), 4.7-5.3 (8H, m), 6.73 (1H, d,  $J=8.2\text{Hz}$ ), 6.8-7.1 (5H, m), 7.19 (1H, s), 7.3-7.5 (3H, m), 7.75 (2H, d,  $J=8.7\text{Hz}$ ), 7.8-8.0 (4H, m), 8.08 (1H, d,  $J=8.9\text{Hz}$ ), 8.30 (1H, d,  $J=7.7\text{Hz}$ ), 8.7-9.0 (3H, m)

30

35

$\rho$  FAB-MASS :  $m/z = 1327$  ( $M+\text{Na}^+$ )

Elemental Analysis Calcd. for  $C_{57}H_{73}N_{10}O_{22}NaS \cdot 9H_2O$  :  
 C 46.65, H 6.25, N 9.54  
 Found : C 46.95, H 6.22, N 9.55

5 Example 89

IR (KBr) : 3376, 2931, 2858, 1662, 1631, 1521, 1444, 1245, 1047  $cm^{-1}$

10 NMR (DMSO- $d_6$ ,  $\delta$ ) : 0.97 (3H, d,  $J=6.7Hz$ ), 1.09 (3H, d,  $J=5.9Hz$ ), 1.3-1.6 (6H, m), 1.7-2.1 (5H, m), 2.2-2.4 (3H, m), 2.5-2.6 (1H, m), 3.21 (3H, s), 3.2-3.4 (3H, m), 3.6-4.5 (16H, m), 4.79 (2H, d,  $J=6.0Hz$ ), 4.9-5.2 (5H, m), 5.10 (1H, d,  $J=3.6Hz$ ), 5.18 (1H, d,  $J=3.1Hz$ ), 5.26 (1H, d,  $J=4.5Hz$ ), 5.53 (1H, d,  $J=6.0Hz$ ), 6.73 (1H, d,  $J=8.2Hz$ ), 6.8-7.0 (2H, m), 15 7.0-7.2 (3H, m), 7.3-7.5 (3H, m), 7.6-7.9 (8H, m), 8.01 (2H, d,  $J=8.4Hz$ ), 8.12 (1H, d,  $J=8.4Hz$ ), 8.31 (1H, d,  $J=7.7Hz$ ), 8.79 (1H, d,  $J=7.0Hz$ ), 8.85 (1H, s)

20 FAB-MASS :  $m/z = 1367$  ( $M+Na^+$ )

Elemental Analysis Calcd. for  $C_{61}H_{77}N_8O_{23}NaS \cdot 6.5H_2O$  :  
 C 50.10, H 6.20, N 7.66  
 Found : C 50.09, H 6.17, N 7.62

25 Example 90

IR (KBr) : 3363, 2937, 2869, 1646, 1444, 1255  $cm^{-1}$

30 NMR (DMSO- $d_6$ ,  $\delta$ ) : 0.97 (3H, d,  $J=6.7Hz$ ), 1.08 (3H, d,  $J=5.7Hz$ ), 1.2-1.6 (10H, m), 1.7-2.1 (5H, m), 2.1-2.4 (3H, m), 2.5-2.7 (1H, m), 3.20 (3H, s), 3.2-3.4 (1H, m), 3.6-4.6 (16H, m), 4.7-5.2 (8H, m), 5.16 (1H, d,  $J=3.1Hz$ ), 5.24 (1H, d,  $J=4.5Hz$ ), 5.54 (1H, d,  $J=5.8Hz$ ), 6.73 (1H, d,  $J=8.2Hz$ ), 6.8-7.0 (2H, m), 7.1-7.4 (6H, m), 7.97 (2H, d,  $J=8.8Hz$ ), 8.0-8.4 (6H, m), 8.84 (1H, s), 8.92 (1H, d,  $J=7.0Hz$ )

35 FAB-MASS :  $m/z = 1403.6$  ( $M+Na^+$ )

Elemental Analysis Calcd. for  $C_{59}H_{77}N_{10}O_{23}NaS_2 \cdot 6H_2O$  :

C 47.58, H 6.02, N 9.40

Found : C 47.72, H 6.12, N 9.42

CL Example 91

5     P IR (KBr) : 3350, 1668, 1654, 1625, 1537, 1521, 1245,  
                  1047  $\text{cm}^{-1}$

10     P NMR (DMSO- $\text{d}_6$ ,  $\delta$ ) : 0.9-1.1 (6H, m), 1.07 (3H, d,  
                                  J=5.7Hz), 1.4-2.0 (7H, m), 2.2-2.5 (3H, m), 2.5-2.6  
                                  (1H, m), 3.1-3.3 (1H, m), 3.6-4.5 (16H, m), 4.7-5.1  
                                  (7H, m), 5.09 (1H, d, J=5.6Hz), 5.16 (1H, d,  
                                  J=3.1Hz), 5.25 (1H, d, J=4.4Hz), 5.53 (1H, d,  
                                  J=6.0Hz), 6.73 (1H, d, J=8.4Hz), 6.8-7.2 (6H, m)  
                                  7.2-7.5 (4H, m), 7.5-7.8 (6H, m), 8.11 (1H, d,  
                                  J=8.4Hz), 8.32 (1H, d, J=7.7Hz), 8.54 (1H, d,  
15                                J=7.0Hz), 8.84 (1H, s)

       P FAB-MASS :  $m/z = 1259$  ( $M+\text{Na}^+$ )

       P Elemental Analysis Calcd. for  $\text{C}_{54}\text{H}_{69}\text{N}_8\text{O}_{22}\text{NaS}\cdot 8\text{H}_2\text{O}$  :  
                                  C 46.95, H 6.20, N 8.11  
                                  Found : C 47.20, H 6.23, N 8.28

CL Example 92

20     P IR (KBr) : 3359, 2929, 2852, 1668, 1650, 1631, 1538,  
                  1515  $\text{cm}^{-1}$

25     P NMR (DMSO- $\text{d}_6$ ,  $\delta$ ) : 0.96 (3H, d, J=6.7Hz), 1.09 (3H, d,  
                                  J=6.1Hz), 1.2-1.6 (5H, m), 1.6-2.5 (10H, m), 2.5-  
                                  2.6 (1H, m), 3.18 (1H, m), 3.7-4.5 (15H, m), 4.8-  
                                  5.2 (8H, m), 5.17 (1H, d, J=3.1Hz), 5.26 (1H, d,  
                                  J=4.5Hz), 5.55 (1H, d, J=5.9Hz), 6.73 (1H, d,  
                                  J=8.1Hz), 6.81 (1H, s), 6.85 (1H, s), 7.05 (1H, s),  
30                                7.2-7.4 (3H, m), 7.45 (2H, d, J=8.2Hz), 7.96 (2H,  
                                  d, J=8.2Hz), 8.0-8.2 (4H, s), 8.2-8.3 (1H, m), 8.85  
                                  (1H, s), 8.9-9.0 (1H, d, J=7.0Hz)

       P FAB-MASS :  $m/z = 1327.5$  ( $M+\text{Na}^+$ )

35     P Elemental Analysis Calcd. for  $\text{C}_{56}\text{H}_{69}\text{N}_{10}\text{O}_{21}\text{S}_2\text{Na}\cdot 6\text{H}_2\text{O}$  :  
                                  C 47.59, H 5.78, N 9.91

Found : C 47.89, H 5.76, N 9.93

Example 93

IR (KBr) : 3350, 1654, 1629, 1517, 1249, 1047  $\text{cm}^{-1}$   
NMR (DMSO- $d_6$ ,  $\delta$ ) : 0.9-1.1 (6H, m), 1.11 (3H, d,  $J=5.9\text{Hz}$ ), 1.6-2.0 (5H, s), 2.1-2.4 (3H, s), 2.6-2.7 (1H, m), 3.1-3.3 (1H, m), 3.6-4.5 (16H, m), 4.7-5.2 (7H, m), 5.10 (1H, d,  $J=5.6\text{Hz}$ ), 5.17 (1H, d,  $J=3.1\text{Hz}$ ), 5.25 (1H, d,  $J=4.5\text{Hz}$ ), 5.55 (1H, d,  $J=5.7\text{Hz}$ ), 6.7-6.9 (3H, m), 7.0-7.5 (6H, m), 7.74 (2H, d,  $J=8.8\text{Hz}$ ), 7.91 (2H, d,  $J=8.5\text{Hz}$ ), 8.1-8.4 (8H, m), 8.84 (1H, s), 8.97 (1H, d,  $J=7.0\text{Hz}$ )  
FAB-MASS :  $m/z = 1363.5$  ( $M+\text{Na}$ )<sup>+</sup>  
Elemental Analysis Calcd. for  $\text{C}_{59}\text{H}_{69}\text{N}_{10}\text{O}_{23}\text{SNa}\cdot 5\text{H}_2\text{O}$  :  
C 49.51, H 5.56, N 9.79  
Found : C 49.39, H 5.63, N 9.77

Example 94

IR (KBr) : 3355, 2929, 2856, 1664, 1631, 1519, 1440, 1282  $\text{cm}^{-1}$   
NMR (DMSO- $d_6$ ,  $\delta$ ) : 0.84 (3H, t,  $J=6.7\text{Hz}$ ), 0.96 (3H, d,  $J=6.7\text{Hz}$ ), 1.07 (3H, t,  $J=5.8\text{Hz}$ ), 1.2-1.5 (12H, m), 1.7-2.0 (5H, m), 2.2-2.4 (3H, m), 2.5-2.7 (1H, m), 2.94 (2H, t,  $J=7.4\text{Hz}$ ), 3.1-3.3 (1H, m), 3.6-4.6 (14H, m), 4.8-5.2 (7H, m), 5.10 (1H, d,  $J=3.6\text{Hz}$ ), 5.17 (1H, d,  $J=3.1\text{Hz}$ ), 5.26 (1H, d,  $J=4.5\text{Hz}$ ), 5.55 (1H, d,  $J=5.9\text{Hz}$ ), 6.73 (1H, d,  $J=8.2\text{Hz}$ ), 6.8-7.0 (2H, m), 7.0-7.5 (4H, m), 8.0-8.2 (5H, m), 8.27 (1H, d,  $J=7.7\text{Hz}$ ), 8.85 (1H, s), 8.93 (1H, d,  $J=7.0\text{Hz}$ )  
FAB-MASS :  $m/z = 1279$  ( $M+\text{Na}^+$ )  
Elemental Analysis Calcd. for  $\text{C}_{53}\text{H}_{73}\text{N}_{10}\text{O}_{22}\text{SNa}\cdot 5.5\text{H}_2\text{O}$  :  
C 46.93, H 6.24, N 10.33  
Found : C 46.93, H 6.46, N 10.31

CL

Example 95

IR (KBr) : 3363, 1673, 1648, 1538, 1253  $\text{cm}^{-1}$

NMR (DMSO- $d_6$ ,  $\delta$ ) : 0.92 (3H, t,  $J=6.8\text{Hz}$ ), 0.97 (3H, d,  $J=6.8\text{Hz}$ ), 1.10 (3H, d,  $J=5.8\text{Hz}$ ), 1.2-1.5 (6H, m), 1.7-2.1 (5H, m), 2.1-2.4 (3H, m), 2.5-2.6 (1H, m), 3.1-3.3 (1H, m), 3.6-4.5 (16H, m), 4.7-5.1 (9H, m), 5.16 (1H, d,  $J=3.1\text{Hz}$ ), 5.24 (1H, d,  $J=4.5\text{Hz}$ ), 5.54 (1H, d,  $J=5.8\text{Hz}$ ), 6.73 (1H, d,  $J=8.2\text{Hz}$ ), 6.8-7.4 (8H, m), 8.04 (2H, d,  $J=8.8\text{Hz}$ ), 8.13 (2H, d,  $J=8.6\text{Hz}$ ), 8.2-8.4 (4H, m), 8.84 (1H, s), 8.98 (1H, d,  $J=7.0\text{Hz}$ )

FAB-MASS :  $m/z = 1329.6$  ( $M+\text{Na}$ ) $^+$

Elemental Analysis Calcd. for  $\text{C}_{56}\text{H}_{71}\text{N}_{10}\text{O}_{23}\text{SNa}\cdot 7\text{H}_2\text{O}$  :

C 46.92, H 5.97, N 9.77

Found : C 46.86, H 5.99, N 9.77

CL

Example 96

IR (KBr) : 3355, 2929, 1666, 1648, 1631, 1515, 1442, 1047  $\text{cm}^{-1}$

NMR (DMSO- $d_6$ ,  $\delta$ ) : 0.87 (3H, t,  $J=6.7\text{Hz}$ ), 0.97 (3H, d,  $J=6.7\text{Hz}$ ), 1.10 (3H, d,  $J=5.8\text{Hz}$ ), 1.2-1.5 (10H, m), 1.7-2.1 (5H, m), 2.1-2.4 (3H, m), 2.5-2.6 (1H, m), 3.1-3.3 (1H, m), 3.6-4.6 (16H, m), 4.79 (2H, d,  $J=5.9\text{Hz}$ ), 4.8-5.2 (5H, m), 5.09 (1H, d,  $J=5.5\text{Hz}$ ), 5.16 (1H, d,  $J=3.1\text{Hz}$ ), 5.23 (1H, d,  $J=4.5\text{Hz}$ ), 5.53 (1H, d,  $J=5.9\text{Hz}$ ), 6.73 (1H, d,  $J=8.0\text{Hz}$ ), 6.8-6.9 (2H, m), 7.0-7.5 (6H, m), 7.97 (2H, d,  $J=8.8\text{Hz}$ ), 8.0-8.3 (6H, m), 8.83 (1H, s), 8.88 (1H, d,  $J=7.0\text{Hz}$ )

FAB-MASS :  $m/z = 1373.5$  ( $M+\text{Na}$ ) $^+$

Elemental Analysis Calcd. for  $\text{C}_{58}\text{H}_{75}\text{N}_{10}\text{O}_{22}\text{S}_2\text{Na}\cdot 6\text{H}_2\text{O}$  :

C 47.73, H 6.01, N 9.60

Found : C 47.57, H 5.92, N 9.53

CL Example 97

IR (KBr) : 3361, 2925, 2852, 1668, 1650, 1631, 1538,  
1452, 1049  $\text{cm}^{-1}$

NMR (DMSO- $d_6$ ,  $\delta$ ) : 0.87 (3H, t,  $J=6.9\text{Hz}$ ), 0.96 (3H, d,  $J=6.7\text{Hz}$ ), 1.08 (3H, d,  $J=5.7\text{Hz}$ ), 1.2-1.4 (11H, m),  
1.4-1.6 (2H, m), 1.7-2.1 (5H, m), 2.1-2.5 (5H, m),  
2.5-2.6 (1H, m), 3.1-3.3 (2H, m), 3.7-4.5 (14H, m),  
4.7-5.0 (7H, m), 5.09 (1H, d,  $J=5.6\text{Hz}$ ), 5.16 (1H, d,  $J=3.1\text{Hz}$ ), 5.25 (1H, d,  $J=4.5\text{Hz}$ ), 5.54 (1H, d,  $J=5.8\text{Hz}$ ), 6.73 (1H, d,  $J=8.2\text{Hz}$ ), 6.8-7.0 (2H, d),  
7.04 (1H, s), 7.2-7.5 (3H, m), 8.03 (4H, s), 8.0-8.3 (2H, m), 8.84 (1H, s), 8.95 (1H, d,  $J=7.0\text{Hz}$ )

FAB-MASS :  $m/z = 1321.9$  ( $M+\text{Na}^+$ )

Elemental Analysis Calcd. for  $\text{C}_{55}\text{H}_{75}\text{N}_{10}\text{O}_{21}\text{S}_2\text{Na}\cdot 5\text{H}_2\text{O}$  :  
C 47.54, H 6.17, N 10.08  
Found : C 47.38, H 6.12, N 9.98

Example 98

IR (KBr) : 3374, 2937, 2875, 1658, 1629, 1531, 1436,  
1255, 1047  $\text{cm}^{-1}$

NMR (DMSO- $d_6$ ,  $\delta$ ) : 0.9-1.11 (6H, m), 1.09 (3H, d,  $J=5.7\text{Hz}$ ), 1.2-1.5 (4H, m), 1.7-2.1 (5H, m), 2.2-2.5 (3H, m), 2.6-2.7 (1H, m), 3.2-3.3 (1H, m), 3.6-4.5 (16H, m), 4.80 (2H, d,  $J=5.8\text{Hz}$ ), 4.8-5.2 (5H, m), 5.10 (1H, d,  $J=5.5\text{Hz}$ ), 5.17 (1H, d,  $J=3.0\text{Hz}$ ), 5.24 (1H, d,  $J=4.5\text{Hz}$ ), 5.53 (1H, d,  $J=5.8\text{Hz}$ ), 6.73 (1H, d,  $J=8.2\text{Hz}$ ), 6.8-7.0 (2H, m), 7.06 (1H, s), 7.10 (2H, d,  $J=8.9\text{Hz}$ ), 7.2-7.5 (3H, m), 7.68 (1H, s), 7.86 (2H, d,  $J=8.8\text{Hz}$ ), 8.0-8.4 (6H, m), 8.84 (1H, s), 8.90 (1H, d,  $J=7.0\text{Hz}$ )

FAB-MASS :  $m/z = 1314$  ( $M+\text{Na}^+$ )

Elemental Analysis Calcd. for  $\text{C}_{56}\text{H}_{70}\text{N}_9\text{O}_{23}\text{NaS}\cdot 6\text{H}_2\text{O}$  :  
C 48.03, H 5.90, N 9.00  
Found : C 47.92, H 5.83, N 8.88

Example 99



- IR (KBr) : 3345, 1646, 1633, 1531, 1257  $\text{cm}^{-1}$
- NMR (DMSO- $\text{d}_6$ ,  $\delta$ ) : 0.97 (3H, d,  $J=6.7\text{Hz}$ ), 1.11 (3H, d,  $J=5.7\text{Hz}$ ), 1.2-1.6 (10H, m), 1.7-2.5 (8H, m), 2.6-2.7 (1H, m), 3.21 (3H, s), 3.3-3.4 (1H, m), 3.7-4.6 (16H, m), 4.8-5.2 (8H, m), 5.16 (1H, d,  $J=3.1\text{Hz}$ ), 5.24 (1H, d,  $J=4.5\text{Hz}$ ), 5.55 (1H, d,  $J=5.7\text{Hz}$ ), 6.7-6.9 (3H, m), 7.0-7.5 (6H, m), 8.0-8.3 (8H, m), 8.84 (1H, s), 8.96 (1H, d,  $J=7.0\text{Hz}$ )
- FAB-MASS :  $m/z = 1387.7$  ( $\text{M}+\text{Na}^+$ )
- Elemental Analysis Calcd. for  $\text{C}_{59}\text{H}_{77}\text{N}_{10}\text{O}_{24}\text{NaS}\cdot 6\text{H}_2\text{O}$  :  
C 48.09, H 6.09, N 9.51  
Found : C 47.81, H 5.83, N 9.38

Example 100

- IR (KBr) : 3357, 1668, 1631, 1429, 1284, 1047  $\text{cm}^{-1}$
- NMR (DMSO- $\text{d}_6$ ,  $\delta$ ) : 0.97 (3H, d,  $J=6.7\text{Hz}$ ), 1.09 (3H, d,  $J=5.8\text{Hz}$ ), 1.8-2.4 (6H, m), 2.5-2.6 (1H, m), 3.1-3.2 (1H, m), 3.7-4.6 (14H, m), 4.7-5.2 (7H, m), 5.10 (1H, d,  $J=5.5\text{Hz}$ ), 5.17 (1H, d,  $J=3.1\text{Hz}$ ), 5.24 (1H, d,  $J=5.5\text{Hz}$ ), 5.53 (1H, d,  $J=5.8\text{Hz}$ ), 6.75 (1H, d,  $J=8.2\text{Hz}$ ), 6.8-6.9 (2H, m), 7.05 (1H, s), 7.3-7.6 (9H, m), 7.8-7.9 (4H, m), 8.0-8.2 (5H, m), 8.2-8.3 (1H, m), 8.34 (1H, d,  $J=9.3\text{Hz}$ ), 8.7-8.8 (1H, m), 8.85 (1H, s)
- FAB-MASS :  $m/z = 1332.7$  ( $\text{M}+\text{Na}^+$ )
- Elemental Analysis Calcd. for  $\text{C}_{58}\text{H}_{65}\text{N}_{10}\text{O}_{22}\text{SNa}\cdot 8\text{H}_2\text{O}$  :  
C 47.93, H 5.62, N 9.64  
Found : C 47.83, H 5.53, N 9.56

Example 101

- IR (KBr) : 3353, 2929, 2856, 1666, 1631, 1612, 1496, 1440, 1259  $\text{cm}^{-1}$
- NMR (DMSO- $\text{d}_6$ ,  $\delta$ ) : 0.87 (3H, t,  $J=6.6\text{Hz}$ ), 0.97 (3H, d,  $J=6.5\text{Hz}$ ), 1.09 (3H, d,  $J=5.9\text{Hz}$ ), 1.2-1.5 (10H, m), 1.7-2.1 (5H, m), 2.2-2.5 (3H, m), 2.6-2.7 (1H, m),

3.1-3.2 (1H, m), 3.6-4.5 (16H, m), 4.7-5.0 (3H, m),  
5.0-5.2 (5H, m), 5.10 (1H, d,  $J=3.1\text{Hz}$ ), 5.26 (1H,  
d,  $J=4.2\text{Hz}$ ), 5.56 (1H, d,  $J=5.5\text{Hz}$ ), 6.73 (1H, d,  
 $J=8.1\text{Hz}$ ), 6.8-7.0 (2H, m), 7.05 (1H, s), 7.1-7.5  
5 (5H, m), 8.0-8.4 (8H, m), 8.85 (1H, s), 8.95 (1H, d,  
 $J=7.0\text{Hz}$ )

$\rho$  FAB-MASS :  $m/z = 1357.3$  ( $M+\text{Na}^+$ )

$\rho$  Elemental Analysis Calcd. for  $\text{C}_{58}\text{H}_{75}\text{N}_{10}\text{O}_{23}\text{NaS}\cdot 7\text{H}_2\text{O}$  :  
C 47.67, H 6.14, N 9.58  
10 Found : C 47.63, H 6.42, N 9.52

$\checkmark$  Example 102

$\rho$  IR (KBr) : 3361, 1670, 1648, 1633, 1540, 1519,  
1249  $\text{cm}^{-1}$

15  $\rho$  NMR ( $\text{DMSO}-d_6$ ,  $\delta$ ) : 0.89 (3H, t,  $J=7.0\text{Hz}$ ), 0.97 (3H, d,  
 $J=6.8\text{Hz}$ ), 1.10 (3H, d,  $J=5.7\text{Hz}$ ), 1.2-1.5 (6H, m),  
1.6-2.4 (8H, m), 2.5-2.7 (1H, m), 3.1-3.3 (1H, m),  
3.6-4.5 (16H, m), 4.80 (2H, d,  $J=5.8\text{Hz}$ ), 4.8-5.2  
(5H, m), 5.10 (1H, d,  $J=5.4\text{Hz}$ ), 5.18 (1H, d,  
20  $J=3.1\text{Hz}$ ), 5.25 (1H, d,  $J=4.3\text{Hz}$ ), 5.55 (1H, d,  
 $J=5.7\text{Hz}$ ), 6.73 (1H, d,  $J=8.2\text{Hz}$ ), 6.8-7.0 (2H, m),  
7.0-7.5 (6H, m), 8.02 (1H, d,  $J=5.3\text{Hz}$ ), 8.0-8.4  
(4H, m), 8.42 (2H, d,  $J=8.4\text{Hz}$ ), 8.48 (2H, d,  
 $J=8.9\text{Hz}$ ), 8.8-9.0 (3H, m)

25  $\rho$  FAB-MASS :  $m/z = 1339.3$  ( $M+\text{Na}^+$ )

$\rho$  Elemental Analysis Calcd. for  $\text{C}_{58}\text{H}_{73}\text{N}_{10}\text{O}_{22}\text{SNa}\cdot 6\text{H}_2\text{O}$  :  
C 48.87, H 6.01, N 9.83  
Found : C 49.16, H 5.92, N 9.86

30  $\checkmark$  Example 103

$\rho$  IR (KBr) : 3350, 2971, 2859, 1672, 1629, 1537, 1442,  
1247, 1047  $\text{cm}^{-1}$

$\rho$  NMR ( $\text{DMSO}-d_6$ ,  $\delta$ ) : 0.96 (3H, d,  $J=6.8\text{Hz}$ ), 1.0-1.2 (6H,  
m), 1.2-1.6 (12H, m), 1.7-2.5 (8H, m), 2.5-2.6 (1H,  
35 m), 3.2-3.6 (7H, m), 3.7-4.5 (16H, m), 4.76 (2H, d,

J=5.6Hz), 4.8-5.1 (5H, m), 5.09 (1H, d, J=5.5Hz),  
5.16 (1H, d, J=3.1Hz), 5.23 (1H, d, J=5.5Hz), 5.51  
(1H, d, J=5.9Hz), 6.73 (1H, d, J=8.2Hz), 6.8-6.9  
(2H, m), 7.0-7.1 (3H, m), 7.3-7.5 (3H, m), 7.67  
5 (2H, d, J=6.9Hz), 7.71 (2H, d, J=6.9Hz), 7.95 (2H,  
d, J=8.4Hz), 8.05 (1H, d, J=7.0Hz), 8.23 (1H, d,  
J=7.7Hz), 8.70 (1H, d, J=7.0Hz), 8.84 (1H, s)

⌘ FAB-MASS :  $m/z = 1377.1$  ( $M+Na^+$ )

⌘ Elemental Analysis Calcd. for  $C_{60}H_{83}N_8O_{24}NaS \cdot 5H_2O$  :  
10 C 49.86, H 6.49, N 7.75  
Found : C 49.74, H 6.73, N 7.68

CL  
Example 104

⌘ IR (KBr) : 3349, 2937, 2858, 1672, 1629, 1537, 1444,  
15 1249, 1047  $cm^{-1}$

⌘ NMR (DMSO- $d_6$ ,  $\delta$ ) : 0.96 (3H, d, J=6.7Hz), 1.08 (3H, d,  
J=5.6Hz), 1.2-1.7 (14H, m), 1.7-2.1 (5H, m), 2.1-  
2.4 (5H, m), 2.5-2.6 (1H, m), 3.1-3.2 (1H, m), 3.4-  
3.6 (4H, m), 3.7-4.5 (16H, m), 4.77 (2H, d,  
20 J=5.7Hz), 4.8-5.2 (5H, m), 5.09 (1H, d, J=5.6Hz),  
5.16 (1H, d, J=3.1Hz), 5.24 (1H, d, J=4.5Hz), 5.51  
(1H, d, J=5.8Hz), 6.73 (1H, d, J=8.2Hz), 6.8-6.9  
(2H, m), 7.0-7.1 (3H, m), 7.3-7.5 (3H, m), 7.6-7.8  
(4H, m), 7.96 (2H, d, J=8.4Hz), 8.10 (1H, d,  
25 J=8.4Hz), 8.24 (1H, d, J=7.7Hz), 8.71 (1H, d,  
J=7.0Hz), 8.89 (1H, s)

⌘ FAB-MASS :  $m/z = 1386.5$  ( $M+Na^+$ )

⌘ Elemental Analysis Calcd. for  $C_{61}H_{82}N_9O_{23}NaS \cdot 6H_2O$  :  
30 C 49.76, H 6.43, N 8.56  
Found : C 49.99, H 6.39, N 8.52

CL  
Example 105

⌘ IR (KBr) : 3350, 2933, 2856, 1664, 1631, 1604, 1511,  
1450, 1243, 1045  $cm^{-1}$

35 ⌘ NMR (DMSO- $d_6$ ,  $\delta$ ) : 0.86 (3H, t, J=6.7Hz), 0.96 (3H, d,

J=6.5Hz), 1.05 (3H, d, J=5.7Hz), 1.2-1.5 (8H, m),  
1.6-2.0 (5H, m), 2.1-2.4 (3H, m), 2.5-2.6 (1H, m),  
3.0-3.3 (5H, m), 3.6-4.4 (20H, m), 4.7-5.1 (7H, m),  
5.10 (1H, d, J=5.5Hz), 5.16 (1H, d, J=3.1Hz), 5.27  
5 (1H, d, J=4.5Hz), 5.51 (1H, d, J=6.0Hz), 6.7-7.1  
(9H, m), 7.2-7.5 (3H, m), 8.0-8.2 (2H, m), 8.2-8.4  
(1H, m), 8.4-8.6 (1H, m), 8.66 (1H, d, J=2.2Hz),  
8.85 (1H, s)

10  $\rho$  FAB-MASS :  $m/z = 1360$  ( $M+Na^+$ )  
 $\rho$  Elemental Analysis Calcd. for  $C_{58}H_{80}N_{11}O_{22}SNa \cdot 6H_2O$  :  
C 48.16, H 6.41, N 10.65  
Found : C 47.91, H 6.31, N 10.56

Example 106

15  $\rho$  IR (KBr) : 3369, 3345, 2935, 1672, 1629, 1511, 1245,  
1047  $cm^{-1}$   
 $\rho$  NMR (DMSO- $d_6$ ,  $\delta$ ) : 0.96 (3H, d, J=6.7Hz), 1.06 (3H, d,  
J=5.8Hz), 1.3-1.6 (10H, m), 1.6-2.0 (5H, m), 2.1-  
2.4 (3H, m), 2.5-2.6 (1H, m), 3.20 (3H, s), 3.28  
20 (2H, t, J=6.4Hz), 3.1-3.4 (5H, m), 3.7-4.5 (20H,  
m), 4.7-5.1 (7H, m), 5.08 (1H, d, J=5.5Hz), 5.15  
(1H, d, J=3.1Hz), 5.23 (1H, d, J=4.5Hz), 5.48 (1H,  
d, J=5.8Hz), 6.73 (1H, d, J=8.2Hz), 6.82 (2H, d,  
J=9.1Hz), 6.94 (2H, d, J=9.1Hz), 6.9-7.0 (1H, m),  
25 7.04 (1H, s), 7.3-7.5 (3H, m), 8.0-8.1 (2H, m),  
8.27 (1H, d, J=7.7Hz), 8.49 (1H, d, J=7.0Hz), 8.66  
(1H, d, J=2.2Hz), 8.84 (1H, s)  
 $\rho$  FAB-MASS :  $m/z = 1404$  ( $M+Na^+$ )

Example 107

30  $\rho$  IR (KBr) : 3357, 1647, 1631, 1537, 1444, 1249,  
1049  $cm^{-1}$   
 $\rho$  NMR (DMSO- $d_6$ ,  $\delta$ ) : 0.9-1.1 (6H, m), 1.09 (3H, d,  
J=5.9Hz), 1.6-2.4 (8H, m), 2.4-2.5 (1H, m), 3.1-3.3  
35 (1H, m), 3.6-4.5 (16H, m), 4.8-5.2 (7H, m), 5.10

(1H, d, J=5.6Hz), 5.17 (1H, d, J=3.1Hz), 5.25 (1H, d, J=4.5Hz), 5.55 (1H, d, J=5.9Hz), 6.73 (1H, d, J=8.2Hz), 6.8-7.0 (2H, m), 7.0-7.6 (6H, m), 7.73 (2H, d, J=8.7Hz), 7.86 (2H, d, J=8.5Hz), 8.0-8.3 (8H, m), 8.84 (1H, s), 8.9-9.0 (1H, m)

FAB-MASS :  $m/z = 1379.4$  ( $M+Na$ )<sup>+</sup>  
Elemental Analysis Calcd. for  $C_{59}H_{69}N_{10}O_{22}S_2Na \cdot 6H_2O$  :  
C 48.36, H 5.57, N 9.56  
Found : C 48.18, H 5.60, N 9.36

The Object Compounds (108) to (117) were obtained according to a similar manner to that of Example 27.

Example 108

IR (KBr) : 3350, 2933, 1670, 1627, 1521, 1436, 1272, 1047  $cm^{-1}$   
NMR (DMSO- $d_6$ ,  $\delta$ ) : 0.85 (3H, t, J=6.7Hz), 0.92 (3H, d, J=6.7Hz), 1.1-1.4 (11H, m), 1.7-2.4 (9H, m), 3.1-3.2 (1H, m), 3.5-5.4 (27H, m), 6.6-7.2 (8H, m), 7.5-7.8 (3H, m), 7.8-8.0 (3H, m), 8.1-8.8 (3H, m)  
FAB-MASS :  $m/z = 1249.4$  ( $M+Na$ )<sup>+</sup>  
Elemental Analysis Calcd. for  $C_{52}H_{71}N_{10}O_{21}NaS \cdot 7H_2O$  :  
C 46.15, H 6.33, N 10.35  
Found : C 46.12, H 6.35, N 10.24

Example 109

IR (KBr pelet) : 3361, 2933, 2856, 1670, 1652, 1616, 1540, 1508, 1448, 1261, 1047  $cm^{-1}$   
NMR (DMSO- $d_6$ ,  $\delta$ ) : 0.86 (3H, t, J=6.6Hz), 0.97 (3H, d, J=6.8Hz), 1.12 (3H, d, J=6.8Hz), 1.2-1.5 (10H, m), 1.7-2.0 (5H, m), 2.2-2.6 (4H, m), 3.1-3.2 (1H, m), 3.7-4.4 (16H, m), 4.8-5.3 (10H, m), 5.59 (1H, d, J=6.0Hz), 6.7-6.9 (3H, m), 7.0-7.4 (7H, m), 7.8-8.2 (4H, m), 8.8-9.0 (2H, m)  
FAB-MASS :  $m/z = 1280.3$  ( $M+Na$ )<sup>+</sup>

Elemental Analysis Calcd. for  $C_{54}H_{72}N_9O_{23}NaS \cdot 7H_2O$  :  
C 46.45, H 6.21, N 9.03  
Found : C 46.68, H 6.44, N 9.03

5 Example 110

IR (KBr) : 3350, 2931, 1670, 1627, 1540, 1436, 1276,  
1047  $cm^{-1}$

10 NMR (DMSO- $d_6$ ,  $\delta$ ) : 0.87 (3H, t,  $J=6.8Hz$ ), 0.93 (2H, d,  
 $J=8.8Hz$ ), 1.08 (2H, d,  $J=5.9Hz$ ), 1.2-1.4 (4H, m),  
1.5-1.7 (2H, m), 1.7-2.1 (3H, m), 2.1-2.4 (3H, m),  
2.6-2.7 (3H, m), 3.1-3.3 (1H, m), 3.6-4.5 (17H, m),  
4.7-5.4 (8H, m), 6.73 (1H, d,  $J=8.2Hz$ ), 6.83 (2H,  
d,  $J=8.2Hz$ ), 7.0-7.1 (1H, m), 7.2-7.5 (5H, m), 7.65  
15 (2H, d,  $J=8.2Hz$ ), 7.74 (2H, d,  $J=8.4Hz$ ), 7.98 (2H,  
d,  $J=8.4Hz$ ), 8.08 (1H, d,  $J=8.5Hz$ ), 8.25 (1H, d,  
 $J=8.5Hz$ ), 8.74 (1H, d,  $J=7.6Hz$ ), 8.7-9.0 (1H, br)

FAB-MASS :  $m/z = 1231.2$  ( $M+Na^+$ )

20 Elemental Analysis Calcd. for  $C_{53}H_{69}N_8O_{21}NaS \cdot 3H_2O$  :  
C 50.39, H 5.98, N 8.87  
Found : C 50.34, H 6.25, N 8.90

Example 111

IR (KBr) : 3353.6, 1670.1, 1652.7, 1623.8  $cm^{-1}$

25 NMR (DMSO- $d_6$ ,  $\delta$ ) : 0.96 (3H, d,  $J=6.7Hz$ ), 1.07 (3H, d,  
 $J=5.6Hz$ ), 1.20-1.62 (8H, m), 1.62-2.00 (5H, m),  
2.10-2.65 (4H, m), 3.20 (3H, s), 3.08-3.40 (1H, m),  
3.30 (2H, t,  $J=6.5Hz$ ), 3.53-4.50 (15H, m), 4.68-  
5.13 (9H, m), 5.16 (1H, d,  $J=2.9Hz$ ), 5.26 (1H, d,  
 $J=4.5Hz$ ), 5.53 (1H, d,  $J=5.9Hz$ ), 6.68-6.95 (4H, m),  
30 6.95-7.11 (3H, m), 7.20-7.52 (3H, m), 7.55-7.95  
(7H, m), 8.13 (1H, d,  $J=8.4Hz$ ), 8.31 (1H, d,  
 $J=7.7Hz$ ), 8.53 (1H, d,  $J=7.0Hz$ ), 8.85 (1H, s)

FAB-MASS :  $m/z = 1331.5$  ( $M+Na-1$ )

35 Elemental Analysis Calcd. for  $C_{58}H_{77}N_8NaO_{23}S \cdot 6H_2O$  :  
C 49.15, H 6.33, N 7.91

Found : C 49.07, H 6.53, N 7.84

CL Example 112

- IR (KBr) : 3350, 2937, 1673, 1646, 1631, 1538, 1519,  
1456, 1247, 1049  $\text{cm}^{-1}$
- NMR (DMSO- $d_6$ ,  $\delta$ ) : 0.97 (3H, d,  $J=6.6\text{Hz}$ ), 1.07 (3H, d,  $J=5.7\text{Hz}$ ), 1.3-2.4 (25H, m), 2.5-2.6 (1H, m), 3.2-3.4 (1H, m), 3.5-4.6 (20H, m), 4.8-5.7 (11H, m), 6.73 (1H, d,  $J=8.0\text{Hz}$ ), 6.9-7.0 (2H, m), 7.0-7.2 (3H, m), 7.3-7.6 (3H, m), 7.74 (2H, d,  $J=8.5\text{Hz}$ ), 7.77 (2H, d,  $J=8.3\text{Hz}$ ), 8.02 (2H, d,  $J=8.3\text{Hz}$ ), 8.13 (1H, d,  $J=8.4\text{Hz}$ ), 8.30 (1H, d,  $J=7.7\text{Hz}$ ), 8.77 (1H, d,  $J=7.0\text{Hz}$ ), 8.85 (1H, s)
- FAB-MASS :  $m/z = 1389$  ( $M+\text{Na}^+$ )
- Elemental Analysis Calcd. for  $\text{C}_{61}\text{H}_{83}\text{N}_8\text{O}_{24}\text{NaS}\cdot 7\text{H}_2\text{O}$  :  
C 49.06, H 6.55, N 7.50  
Found : C 49.03, H 6.54, N 7.56

CL Example 113

- NMR (DMSO- $d_6$ ,  $\delta$ ) : 0.84 (3H, t,  $J=6.7\text{Hz}$ ), 0.96 (3H, d,  $J=6.7\text{Hz}$ ), 1.07 (3H, d,  $J=5.9\text{Hz}$ ), 1.1-1.3 (14H, m), 1.7-2.1 (5H, m), 2.2-2.5 (3H, m), 2.6-2.7 (1H, m), 3.1-3.3 (1H, m), 3.7-4.5 (16H, m), 4.7-5.1 (7H, m), 5.10 (1H, d,  $J=5.5\text{Hz}$ ), 5.16 (1H, d,  $J=3.1\text{Hz}$ ), 5.25 (1H, d,  $J=4.5\text{Hz}$ ), 5.49 (1H, d,  $J=5.7\text{Hz}$ ), 6.53 (1H, d,  $J=3.1\text{Hz}$ ), 6.73 (1H, d,  $J=8.2\text{Hz}$ ), 6.8-6.9 (2H, m), 7.05 (1H, m), 7.31 (1H, d,  $J=8.1\text{Hz}$ ), 7.4-7.6 (4H, m), 7.70 (1H, d,  $J=6.7\text{Hz}$ ), 8.08 (1H, d,  $J=8.4\text{Hz}$ ), 8.18 (1H, s), 8.31 (1H, d,  $J=7.7\text{Hz}$ ), 8.57 (1H, d,  $J=7.0\text{Hz}$ ), 8.85 (1H, s)
- FAB-MASS :  $m/z = 1264$  ( $M+\text{Na}^+$ )
- Elemental Analysis Calcd. for  $\text{C}_{54}\text{H}_{76}\text{N}_9\text{O}_{21}\text{NaS}\cdot 6\text{H}_2\text{O}$  :  
C 48.03, H 6.57, N 9.34  
Found : C 48.02, H 6.61, N 9.28

CL Example 114

IR (KBr) : 3350, 2937, 1668, 1631, 1537, 1247, 1047  $\text{cm}^{-1}$

5 NMR (DMSO- $d_6$ ,  $\delta$ ) : 0.85 (3H, t,  $J=7.4\text{Hz}$ ), 0.96 (3H, d,  $J=6.5\text{Hz}$ ), 1.07 (3H, d,  $J=5.7\text{Hz}$ ), 1.3-1.7 (7H, m), 1.7-2.1 (5H, m), 2.2-2.4 (3H, m), 2.6-2.7 (1H, m), 3.0-3.8 (16H, m), 3.8-4.6 (11H, m), 4.7-5.3 (6H, m), 6.73 (1H, d,  $J=8.2\text{Hz}$ ), 6.8-7.0 (2H, m), 7.0-7.2 (3H, m), 7.3-7.5 (3H, m), 7.6-7.8 (4H, m), 7.96 (2H, d,  $J=8.3\text{Hz}$ ), 8.11 (1H, d,  $J=8.2\text{Hz}$ ), 8.26 (1H, d,  $J=7.6\text{Hz}$ ), 8.6-9.0 (2H, m)

10 FAB-MASS :  $m/z = 1319.4$  ( $M+\text{Na}^+$ )

Elemental Analysis Calcd. for  $\text{C}_{57}\text{H}_{77}\text{N}_8\text{O}_{23}\text{NaS}\cdot 8\text{H}_2\text{O}$  :

C 47.50, H 6.50, N 7.77

Found : C 47.72, H 6.85, N 7.85

15 CL Example 115

IR (KBr) : 3350, 1666, 1631, 1546, 1276, 1247  $\text{cm}^{-1}$

20 NMR (DMSO- $d_6$ ,  $\delta$ ) : 0.97 (3H, d,  $J=7.5\text{Hz}$ ), 1.08 (3H, d,  $J=5.7\text{Hz}$ ), 1.4-1.6 (4H, m), 1.6-2.1 (5H, m), 2.1-2.4 (3H, m), 2.5-2.6 (1H, m), 3.1-3.3 (1H, m), 3.23 (3H, s), 3.3-3.5 (2H, m), 3.7-4.5 (16H, m), 4.79 (2H, d,  $J=6.2\text{Hz}$ ), 4.8-5.1 (5H, m), 5.11 (1H, d,  $J=5.6\text{Hz}$ ), 5.18 (1H, d,  $J=3.1\text{Hz}$ ), 5.26 (1H, d,  $J=4.4\text{Hz}$ ), 5.54 (1H, d,  $J=5.7\text{Hz}$ ), 6.73 (1H, d,  $J=8.1\text{Hz}$ ), 6.8-7.0 (2H, m), 7.0-7.1 (3H, m), 7.3-7.5 (3H, m), 7.6-7.9 (8H, m), 8.01 (2H, d,  $J=8.4\text{Hz}$ ), 8.08 (1H, d,  $J=8.4\text{Hz}$ ), 8.32 (1H, d,  $J=7.7\text{Hz}$ ), 8.80 (1H, d,  $J=7.0\text{Hz}$ ), 8.85 (1H, s)

25 FAB-MASS :  $m/z = 1353.9$  ( $M+\text{Na}^+$ )

30 Elemental Analysis Calcd. for  $\text{C}_{60}\text{H}_{75}\text{N}_8\text{O}_{23}\text{NaS}\cdot 9.5\text{H}_2\text{O}$  :

C 47.96, H 6.31, N 7.46

Found : C 47.97, H 6.25, N 7.41

CL Example 116

35 IR (KBr) : 3450, 2935, 1675, 1650, 1540, 1513, 1454,



1047  $\text{cm}^{-1}$

5  $\text{p}$  NMR ( $\text{DMSO-d}_6$ ,  $\delta$ ) : 0.97 (3H, d,  $J=6.7\text{Hz}$ ), 1.09 (3H, d,  $J=5.9\text{Hz}$ ), 1.60 (6H, s), 1.7-2.4 (6H, m), 2.5-2.6 (1H, m), 3.1-3.6 (5H, m), 3.7-4.5 (14H, m), 4.7-5.0 (3H, m), 5.0-5.2 (4H, m), 5.11 (1H, d,  $J=5.5\text{Hz}$ ), 5.18 (1H, d,  $J=3.1\text{Hz}$ ), 5.26 (1H, d,  $J=4.5\text{Hz}$ ), 5.56 (1H, d,  $J=6.0\text{Hz}$ ), 6.8-7.5 (9H, m), 7.84 (2H, d,  $J=8.8\text{Hz}$ ), 8.0-8.4 (6H, m), 8.85 (1H, s), 8.91 (1H, d,  $J=7.0\text{Hz}$ )

10  $\text{p}$  FAB-MASS :  $m/z = 1328$  ( $\text{M}+\text{Na}^+$ )

$\text{p}$  Elemental Analysis Calcd. for  $\text{C}_{55}\text{H}_{68}\text{N}_{11}\text{O}_{21}\text{S}_2\text{Na}\cdot 8\text{H}_2\text{O}$  :  
C 45.55, H 5.84, N 10.62  
Found : C 45.62, H 5.70, N 10.54

15  $\text{cl}$  Example 117

$\text{p}$  IR (KBr) : 3350, 2939, 1664, 1627, 1531, 1446, 1249, 1049  $\text{cm}^{-1}$

20  $\text{p}$  NMR ( $\text{DMSO-d}_6$ ,  $\delta$ ) : 0.8-1.0 (6H, m), 1.4-1.9 (9H, m), 2.0-2.5 (4H, m), 3.1-3.2 (1H, m), 3.22 (3H, s), 3.3-3.4 (2H, m), 3.51 (2H, s), 3.6-4.4 (16H, m), 4.7-5.2 (7H, m), 5.07 (1H, d,  $J=5.6\text{Hz}$ ), 5.17 (1H, d,  $J=3.1\text{Hz}$ ), 5.23 (1H, d,  $J=4.5\text{Hz}$ ), 5.54 (1H, d,  $J=5.9\text{Hz}$ ), 6.7-6.8 (3H, m), 7.0-7.4 (8H, m), 7.5-7.7 (4H, m), 7.70 (4H, s), 8.1-8.2 (2H, m), 8.51 (1H, d,  $J=7.0\text{Hz}$ ), 8.83 (1H, s)

25  $\text{p}$  FAB-MASS :  $m/z = 1367.6$  ( $\text{M}+\text{Na}^+$ )

$\text{p}$  Elemental Analysis Calcd. for  $\text{C}_{61}\text{H}_{77}\text{N}_8\text{O}_{23}\text{SNa}\cdot 6.5\text{H}_2\text{O}$  :  
C 50.01, H 6.20, N 7.66  
Found : C 50.30, H 6.50, N 7.75

30

$\text{cl}$  Example 118

To a solution of The Object Compound (61) (0.25 g) in methanol (50 ml) was added dry 10% palladium on carbon (0.2 g) and stirred for 6 hours under hydrogen atmosphere. The palladium on carbon was filtered off, and the filtrate was

evaporated under reduced pressure to give Object Compound 118 (179 mg).

IR (KBr) : 3400, 1668.1, 1627.6  $\text{cm}^{-1}$

5 NMR (DMSO- $d_6$ ,  $\delta$ ) : 0.92 (3H, d,  $J=6.7\text{Hz}$ ), 1.1-2.45 (40H, m), 3.20 (3H, s), 3.28 (2H, t,  $J=6.5\text{Hz}$ ), 3.0-3.4 (1H, m), 3.5-4.7 (14H, m), 4.95-5.5 (12H, m), 6.55 (1H, d,  $J=8.4\text{Hz}$ ), 6.84 (1H, s), 6.86 (1H, d,  $J=8.4\text{Hz}$ ), 7.0-7.3 (4H, m), 7.9-8.3 (4H, m)

FAB-MASS :  $m/z = 1292$  (M+Na)

10 Elemental Analysis Calcd. for  $\text{C}_{54}\text{H}_{88}\text{N}_9\text{O}_{22}\text{SNa}\cdot 5\text{H}_2\text{O}$  :  
C 47.67, H 7.26, N 9.26

Found : C 47.72, H 7.35, N 8.95

The Object Compounds (119) to (121) were obtained according to a similar manner to that of Example 118.

Example 119

20 NMR (DMSO- $d_6$ ,  $\delta$ ) : 0.87 (3H, t,  $J=6.6\text{Hz}$ ), 1.00 (3H, d,  $J=7.3\text{Hz}$ ), 1.03 (3H, d,  $J=6.0\text{Hz}$ ), 1.2-1.5 (4H, m), 1.5-2.0 (5H, m), 2.1-2.7 (8H, m), 3.17 (1H, m), 3.6-4.5 (14H, m), 4.65-5.7 (12H, m), 6.72 (1H, d,  $J=8.1\text{Hz}$ ), 6.75 (1H, s), 6.80 (1H, d,  $J=8.1\text{Hz}$ ), 7.05 (1H, s), 7.1-7.7 (15H, m), 8.0-8.6 (4H, m), 8.85 (1H, s)

25 FAB-MASS :  $m/z = 1274$  (M+Na)

Elemental Analysis Calcd. for  $\text{C}_{55}\text{H}_{74}\text{N}_9\text{O}_{21}\text{SNa}\cdot 7\text{H}_2\text{O}$  :  
C 47.93, N 6.43, N 9.15

Found : C 48.12, N 6.56, N 9.03

Example 120

30 IR (KBr) : 3355.5, 1672.0 1629.6  $\text{cm}^{-1}$

35 NMR (DMSO- $d_6$ ,  $\delta$ ) : 0.86 (3H, t,  $J=6.6\text{Hz}$ ), 0.98 (3H, d,  $J=6.5\text{Hz}$ ), 1.03 (3H, d,  $J=6.0\text{Hz}$ ), 1.2-2.6 (21H, m), 3.18 (1H, m), 3.6-4.5 (16H, m), 4.65-5.55 (12H, m), 6.6-7.5 (10H, m), 8.0-8.6 (4H, m), 8.89 (1H, s)

f FAB-MASS :  $m/z = 1256$  (M+Na)

CL Example 121

f IR (KBr) : 3357.5, 1660.4, 1629.6, 1249.6  $\text{cm}^{-1}$   
5 f NMR (DMSO- $d_6$ ,  $\delta$ ) : 0.86 (3H, t,  $J=6.6\text{Hz}$ ), 0.96 (3H, d,  $J=6.8\text{Hz}$ ), 1.03 (3H, d,  $J=6.0\text{Hz}$ ), 1.1-1.5 (12H, m), 1.6-2.0 (5H, m), 2.0-2.5 (4H, m), 3.07 (1H, m), 3.5-4.5 (16H, m), 4.6-5.6 (12H, m), 6.72 (1H, d,  $J=8.1\text{Hz}$ ), 6.7-6.9 (4H, m), 7.04 (1H, s), 7.16 (1H, s), 7.1-7.5 (2H, m), 7.25 (2H, d,  $J=8.6\text{Hz}$ ), 8.0-8.2 (3H, m), 8.46 (1H, d,  $J=7\text{Hz}$ ), 8.84 (1H, s)  
10

f FAB-MASS :  $m/z = 1256$  (M+Na)

f Elemental Analysis Calcd. for  $\text{C}_{52}\text{H}_{76}\text{N}_9\text{O}_{22}\text{SNa}\cdot 7\text{H}_2\text{O}$  :

C 45.91, H 6.67, N 9.27

15 Found : C 45.98, H 6.67, N 9.10

CL Example 122

A solution of Object Compound (11) (795 mg) in water (16 ml) was left for 240 hours. The solution was subjected to  
20 column chromatography on ODS (YMC-gel ODS-AMS50) and eluted with 25%  $\text{CH}_3\text{CN}/\text{H}_2\text{O}$ . The fractions containing Object Compound were combined and the acetonitrile was removed under reduced pressure. The residue was lyophilized to give Object Compound (123) (38 mg).  
25

f IR (KBr) : 3361, 2956, 2875, 1668, 1627, 1521, 1249, 1047  $\text{cm}^{-1}$

f NMR (DMSO- $d_6$ ,  $\delta$ ) : 0.8-1.5 (19H, m), 1.6-2.4 (13H, m), 3.1-3.2 (1H, m), 3.5-4.1 (12H, m), 4.1-4.7 (10H, m), 4.9-5.6 (5H, m), 5.98 (1H, d,  $J=10.6\text{Hz}$ ), 6.36 (1H, d,  $J=10.6\text{Hz}$ ), 6.7-7.3 (12H, m), 7.4-8.0 (7H, m)  
30

f FAB-MASS :  $m/z = 1273.1$  (M+Na<sup>+</sup>)

f Elemental Analysis Calcd. for  $\text{C}_{55}\text{H}_{71}\text{N}_8\text{O}_{22}\text{NaS}\cdot 11\text{H}_2\text{O}$  :

C 45.58, H 6.47, N 7.73

35 Found : C 45.83, H 6.26, N 7.75

The Object Compound (123) was obtained according to a similar manner to that of Example 118.

CL Example 123

5 IR (KBr) : 3349.7, 1670.1, 1627.6  $\text{cm}^{-1}$   
 0 NMR (DMSO- $\text{d}_6$ ,  $\delta$ ) : 0.87 (3H, t,  $J=7.2\text{Hz}$ ), 0.96 (3H, d,  $J=6.7\text{Hz}$ ), 1.13 (3H, d,  $J=5.7\text{Hz}$ ), 1.18-1.55 (10H, m), 1.58-2.08 (5H, m), 2.08-2.90 (4H, m), 2.90-3.30 (2H, m), 3.60-4.50 (17H, m), 4.70-5.70 (12H, m), 6.65-7.60 (11H, m), 7.80 (2H, br s), 7.95-8.23 (2H, m), 8.75 (1H, d,  $J=7.0\text{Hz}$ ), 8.85 (1H, s)  
 FAB-MASS :  $m/z = 1114.4$  (M- $\text{SO}_4-2$ )  
 Elemental Analysis Calcd. for  $\text{C}_{52}\text{H}_{77}\text{N}_9\text{O}_{21}\text{S}\cdot 6\text{H}_2\text{O}$  :  
 C 47.88, H 6.88, N 9.66  
 Found : C 47.60, H 6.74, N 9.53

The following compound (124) was obtained according to a similar manner to that of Example 1.

200 ✓ Example 124

IR (KBr) : 3324, 2937, 2873, 1664, 1629, 1442,  
1257  $\text{cm}^{-1}$

NMR (DMSO- $\text{d}_6$ ,  $\delta$ ) : 0.91 (3H, t,  $J=7.1\text{Hz}$ ), 0.96 (3H, d,  $J=6.7\text{Hz}$ ), 1.09 (3H, d,  $J=5.7\text{Hz}$ ), 1.3-1.5 (4H, m),  
1.7-2.6 (9H, m), 3.1-3.3 (1H, m), 3.7-4.6 (16H, m),  
4.7-5.1 (7H, m), 5.11 (1H, d,  $J=5.6\text{Hz}$ ), 5.17 (1H, d,  $J=3.1\text{Hz}$ ), 5.26 (1H, d,  $J=4.5\text{Hz}$ ), 5.55 (1H, d,  $J=5.8\text{Hz}$ ), 6.7-6.9 (3H, m), 7.0-7.6 (6H, m), 7.97 (2H, d,  $J=8.8\text{Hz}$ ), 8.0-8.4 (6H, m), 8.85 (1H, s),  
8.92 (1H, d,  $J=7.0\text{Hz}$ )

FAB-MASS :  $m/z = 1331$  ( $M+\text{Na}^+$ )

Elemental Analysis Calcd. for  $\text{C}_{55}\text{H}_{69}\text{N}_{10}\text{O}_{22}\text{NaS}_2$  :  
C 45.45, H 5.89, N 9.64  
Found : C 45.71, H 5.68, N 9.60

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